Critical Release Notice

Publication number: 297-1001-122
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The content of this customer NTP supports the SN06 (DMS) and ISN06 (TDM) software releases.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017/ISN04 (TDM) that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS)/ISN05 (TDM) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS)/ISN06 (TDM) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

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297–1001–122

DMS-100 Family

Alarm System Description

Reference Manual

BASE12 Standard 06.01 August 1999

NORTEL
NORTHERN TELECOM

DMS-100 Family

Alarm System Description

Reference Manual

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BASE12 Standard 06.01

- document converted to interleaf format
- corrected titles of NTPs referenced in this document
- consolidated information on each alarm system version into separate chapters
- added a chapter for the Low Power DMS Alarm System
- added an index

May 1992

BCS33 Standard 05.01

- added information on the Enhanced Alarm System (EAS)
- changes to the titles of NTPs referenced in this document

Contents

About this document

This document decribes the DMS alarm subsystem. The DMS alarm subsystem is part of the BASE platform in all markets. The DMS alarm subsystem is part of the following DMS-based product lines:

- DMS-100/200/250/300/500
- MSL-100
- MTX
- STP

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

References in this document

The following documents are referred to in this document:

- *DMS-MTX Alarm System Description*, 297-2131-122
- *Provisioning Guide*, 297-1001-450
- *Maintenance System DMS-100/200*, 297–1001–106

- *DMS 100/200 Product Computing Module Load (PCL) Release Document*, PLN-8YYY-004
- *Network Management System Reference Manual*, 297-1001-453
- *Maintenance System Man-Machine Interface Description*, 297-1001-520
- *External Devices Maintenance Guide*, 297-1001-593
- *Trunks Maintenance Guide,* 297-1001-595
- *Translations Guide*
- *Hardware Description Reference Manual,* 297-8991-805

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION
If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury



DANGER
Risk of electrocution
Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage

WARNING
Damage to the backplane connector pins
Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation

CAUTION
Possible loss of service
Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

Introduction

The DMS alarm (sub)system performs the following functions:

- generates audible and visual indications of alarm conditions detected in the DMS switch and related equipment. These alarm indications alert maintenance personnel and help in the identification and location of alarm conditions.
- provides the capability to do the following:
  - — silence audible alarms
  - — transfer alarm signals to a remote monitoring location
  - — combine the alarms of a DMS office with those of other systems on other floors
  - — transfer alarms from an unattended trunk test center (TTC) to the main DMS alarm system
  - — control the office data loop circuit
- provide a dead system alarm that the hardware generates to alert maintenance personnel when the DMS system software does not function
- provide miscellaneous circuits that can include the following (if required):
  - — office talk and data loop circuits
  - — 130 V power supply for the remote alarm transfer circuit

    Note: The 130V power supply is not required for the Low Power Alarm (LPA) system. For more information, refer to DS3X83BA.
  - — 20-Hz ac ringing supply for the audible alarm subsets

    Note: The 20-Hz ringing supply is not part of the LPA system. If you require this supply, you require the NT0X66AC change application kit.

- provide circuits between the dead system alarm (DSA) cards and the network management (NWM) control for automatic level 3 dynamic overload control signaling (SDOC3). These circuits include automatic SDOC3 cutoff when performance of DSA maintenance occurs.
- provides an inactive timing circuit (IATC) clock to monitor and report the duration of a dead system alarm (DSA) condition in an office. The IATC is also called the inactive system timer (IAST)

Note 1: Nortel provides a change application kit (NT0X66AC) for backwards compatibility to older mechanical unique audibles panels.

Note 2: For a description of Mobile Telephone Exchange (MTX) alarm system feature refer to *DMS-MTX Alarm System Description*.

Office Alarm System

The Office Alarm System (OAS) consists of the following:

- alarm software
- maintenance trunk modules (MTM), service trunk modules (STM), or integrated service modules (ISM) that contain the primary and standby office alarm units (OAU)

  Note: The standby OAU is also called the standby MTM or standby ISM.

- various other alarm system hardware devices

Office Alarm System versions

The following versions of the OAS exist:

- Version 1
- Version 2
- Version 2 Enhanced Alarm System (EAS)
- Low Power Alarm system

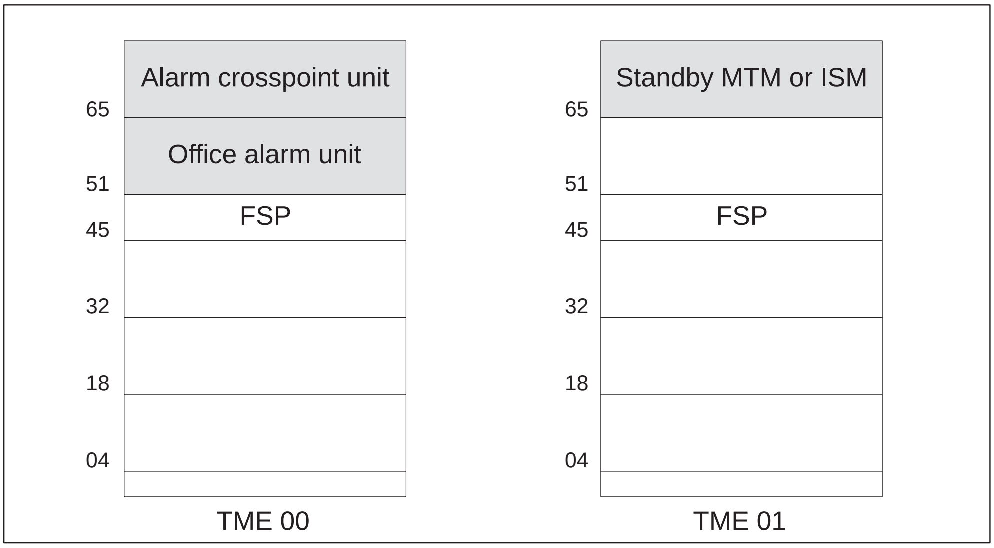
The various OAS versions are described in detail in the following chapters.

Office alarm unit

The OAU is an MTM, STM (compact MTM), or ISM shelf equipped with a transmission, a processor, a control, and a power converter card. The OAU also has slots for up to 12 office alarm circuit, signal distribution, and scan detector cards.

The primary and standby OAUs connect to each other through the alarm crosspoint unit (AXU) and the main distribution frame (MDF). The AXU also connects the primary and standby OAUs to other components of the OAS. Figure 1-1 shows the major hardware components of the OAS and their shelf locations (in inches from the floor).

Figure 1-1
Alarm system hardware



Maintenance trunk module

The MTM is a peripheral module, provisioned in a trunk module equipment (TME) frame, that you can equip as an OAU or a standby MTM.

Service trunk module

The service trunk module is a PM that consists of two compact MTMs. The STM can contain an OAU or a standby MTM.

Integrated services module (ISM)

The integrated services module is a single shelf that replaces the trunk module (TM) or the maintenance trunk module (MTM) shelf. The ISM shelf mounts on a cabinetized ISM (CISM) or ISM equipment (ISME) frame.

Alarm detection

The alarm system software does the following:

- reports system integrity (soft) alarm conditions to the OAS hardware
- monitors and controls alarm system hardware

To respond to reported hardware alarm conditions and to provide control inputs, the alarm system software operates or releases affected signal distribution (SD) points in the alarm system hardware. SD points can be physically connected to visual alarm, audible alarm, and telephony circuits as defined in the OAS software and as provisioned by the operating company.

The alarm system uses scan (SC) points and SD points to monitor and report the alarm status of each equipment row, to a maximum of 40 rows. Scan points detect voltage, ground, open-loop, or closed-loop conditions. Signal distribution points transfer alarm indications to alarm panels and other equipment. Hardware switch settings and datafill in tables ALMSCGRP, ALMSC, ALMSDGRP, and ALMSD define the scan and signal distribution points.

Alarm and control inputs that the alarm system hardware monitors connect to the alarm system software through scan (SC) points. These scan points detect signal inputs generated by the following:

- hard-wired alarm contacts in DMS hardware
- operation of manual-control switches
- alarm circuits in miscellaneous DMS and non-DMS equipment in the central office
- analog trunk circuit-wired contacts

The descriptions of tables ALMSCGRP, ALMSC, ALMSDGRP, and ALMSD in the data schema section of *Tranlations Guide* describe SC point and SD point assignments for the OAS.

The software that monitors the SC points forms the external (EXT) alarms subsystem of the DMS maintenance system. For more information, see *External Devices Maintenance Guide*, 297-1001-593.

System alarm detection

Alarm and control inputs that the software in maintenance subsystems other than EXT generates are called system inputs. Each maintenance subsystem controls its alarm status display in the system status area of the Ext level MAP display (shown in Figure 1-2). The alarm system software checks for changes in the alarm status of the maintenance subsystems every five seconds and updates audible and visual alarm indications when alarm status changes occur.

Figure 1-2
Ext level MAP display

```
   CM     MS    IOD    Net     PM    CCS    Lns    Trks   Ext     APPL
    .      .     .      .       .     .      .       .     .        .

 Ext          Ext Alarms    Crit    FSP   Major  Minor  NoAlm
  0 Quit                      0      0       0      0     12
  2           EXT:
  3
  4
  5
  6
  7 List_
  8 TstDSAlm
  9 SetSD_
 10 SetSC_
 11 Disp_
 12
 13 _Crit
 14 _FSP
 15 _Maj
 16 _Min
 17 _NoAlm
 18
```

Alarm indication

The alarm system software and relay-controlled equipment in the OAU activate audible or visual alarms, or both, when the system detects alarms in the DMS-100 Family office.

Audible alarms

Audible alarms activate on site or transfer to a remote monitoring location. The on-site alarm indication devices mount on the following audible alarm panels:

- main audible alarm panel (NT0X66) for the DMS-100 Family switch
- optional TTC audible alarm panel (NT0X61) for the TTC in toll offices

The audible alarm panel provides indication of a variety of alarm conditions in the office.

Visual alarms

Lamps and control switches mounted on panels at the MAP terminal and at the main exit doors provide visual alarm displays. The alarm control and display (ACD) and alarm display panels provide this function. Each equipment aisle is also equipped with lamps that signal local alarm conditions.

Software subsystems that the maintenance system status display does not represent can also generate alarms. These software alarms, for example, Centralized Automatic Message Accounting (CAMA) suspension, interface

with the alarm system software through table SFWALARM. The EXT subsystem reports these alarms.

For more information on the maintenance system MAP terminal, refer to *Maintenance System Man-Machine Interface Description*, 297-1001-520.

Alarm classes

The system assigns alarm conditions to one of three classes (severity levels). The severity is based on the urgency of the required response to the alarm condition or return of the affected equipment to normal operation. The maintenance subsystem that detects the trouble assigns the class to the alarm condition. The alarm classes, in decreasing order of severity are critical, major, and minor.

Table control

The OAS is controlled by the data schema tables identified in the following paragraphs. These tables define circuits that monitor equipment and activate audible or visual alarms.

Alarm scan groups

A scan detector card (NT0X10) contains two SC groups. Each SC group contains seven SC points. Each SC point monitors a single circuit for a change of state. When a change of state occurs, the alarm system updates the EXT alarm display at the MAP terminal. You can set up SC points to monitor one of the following conditions:

- open or closed loop
- voltage
- ground

Table ALMSCGRP stores SC group data. This table contains information on alarm circuit equipment location and the type of alarm card used. Table ALMSC identifies the function performed by each SC point assigned in table ALMSCGRP.

Alarm signal distribution groups

A signal distribution card (NT2X57) contains two SD groups. Each SD group contains up of seven SD points. Each SD point activates a single audible or visual alarm. You can set up SD points in a variety of configurations.

Table ALMSDGRP stores SD group data. This table contains information on alarm circuit equipment location and the type of alarm card used. Table ALMSD identifies the function performed by each SD point assigned in table ALMSDGRP.

Software alarms

Software subsystems not represented on maintenance system status displays at the MAP terminal can also generate alarms. Table SFWALARM integrates these alarms into alarm system software. The EXT subsystem reports these alarms to operating company personnel.

The system datafills table SFWALARM. You can change entries in this table, but you cannot be add or delete entries.

Office Alarm System Version 1

This chapter contains information on Office Alarm System (OAS) Version 1. Chapter 6 describes the OAS alarms, and alarm and control circuits.

Version 1 OAS hardware and alarm indication devices

The following sections provide information on the main hardware components of the Version 1 OAS and the alarm indication devices mounted on these components.

Office alarm unit

In the Version 1 OAS, the office alarm unit (OAU) and the standby maintenance trunk module (MTM) contain most of the alarm detection and control hardware. The OAU is dedicated to the alarm system. The standby MTM contains the alarm system backup circuits that generate an alarm if the OAU fails. The standby MTM also contains equipment, such as service and test circuits, that is not part of the alarm system. The OAU and standby MTM use the message system to communicate with the alarm system software in central control (CC).

The OAU is an MTM shelf equipped with a transmission, a processor, a control, and a power converter card. The OAU also contains the following cards:

The interface card slots in the Version 1 OAU contain the following cards:

- three signal distribution cards (NT2X57) that provide an interface between the alarm system software and relay-controlled equipment in the OAU. These cards activate audible and visual alarms or other related circuits.
- three to five miscellaneous scan detector cards (NT0X10). The size of the office determines the number of these cards required. The alarm system software uses the scan detector cards to monitor the status of the alarm system hardware. The alarm system software also uses the scan detector cards to detect alarm conditions or the operation of manual-control switches.

- the following miscellaneous office alarm circuit cards:
  - The office alarm circuit #1 card (NT2X41) contains control relays for the alarm grouping circuit and the power plant exit pilot lamps.
  - The office alarm circuit #2 card (NT2X42) contains control relays for the following:
    - remote alarm transfer circuit
    - TTC night alarm transfer circuit
    - TTC Chime
    - DMS exit pilot lamps
    - hardware interrupter circuit for the major chime
  - The office alarm circuit #3 card (NT2X43) occupies two card slots and contains the following:
    - 130 V power supply
    - 20-Hz ac ringing supply
    - monitor circuits and control relays for the OAU and dead system alarms
    - transformer for the ‘odd’ aisle multiple of the local talk line circuit

The shelf layout for a Version 1 OAU is shown in Figure 2-1.

Figure 2-1
Office alarm unit shelf layout

Cards

Card	Description	Slot
NT2X58AA	Filler faceplate	20F
NT0X50AA	Filler faceplate (see Note 1)	19F
		18F
NT2X09AA	Power converter card	17F
NT0X50AC	Scan detector	16F
NT0X50AC	Scan detector	15F
NT0X10AA	Scan detector	14F
NT0X10AA	Scan detector	13F
NT0X10AA	Scan detector	12F
		11F
NT2X43AB	OAC 3 (see Note 2)	10F
NT2X42AB	OAC 2 (see Note 2)	09F
NT2X41AA	OAC 1 (see Note 2)	08F
NT2X57AA	Signal distributor card type 1	07F
NT2X57AA	Signal distributor card type 1	06F
NT2X57AA	Signal distributor card type 1	05F
NT0X50AA	Filler faceplate	04F
NT2X53AA	Control	03F
NT0X07AA	Processor	02F
NT2X45AA	Transmission	01F

⇦ *Rear* *Front* ⇨

Note 1: Slot 19 is available for service circuit or alarm cards.
Note 2: Slots 08, 09, and 10 can have office alarm circuit cards (NT2X41, NT2X42, and NT2X43).

MTM alarm system circuits

In the Version 1 OAS, the standby MTM must contain an office alarm circuit #3 card (NT2X43). This card contains the OAU and dead system (DS) alarm circuits. The standby MTM must also contain at least one signal distribution card (NT2X57) and one scan detector card (NT0X10). The office alarm circuit #3 card provides a backup for the 20-Hz ac ringing and 130 V supplies in the OAU.

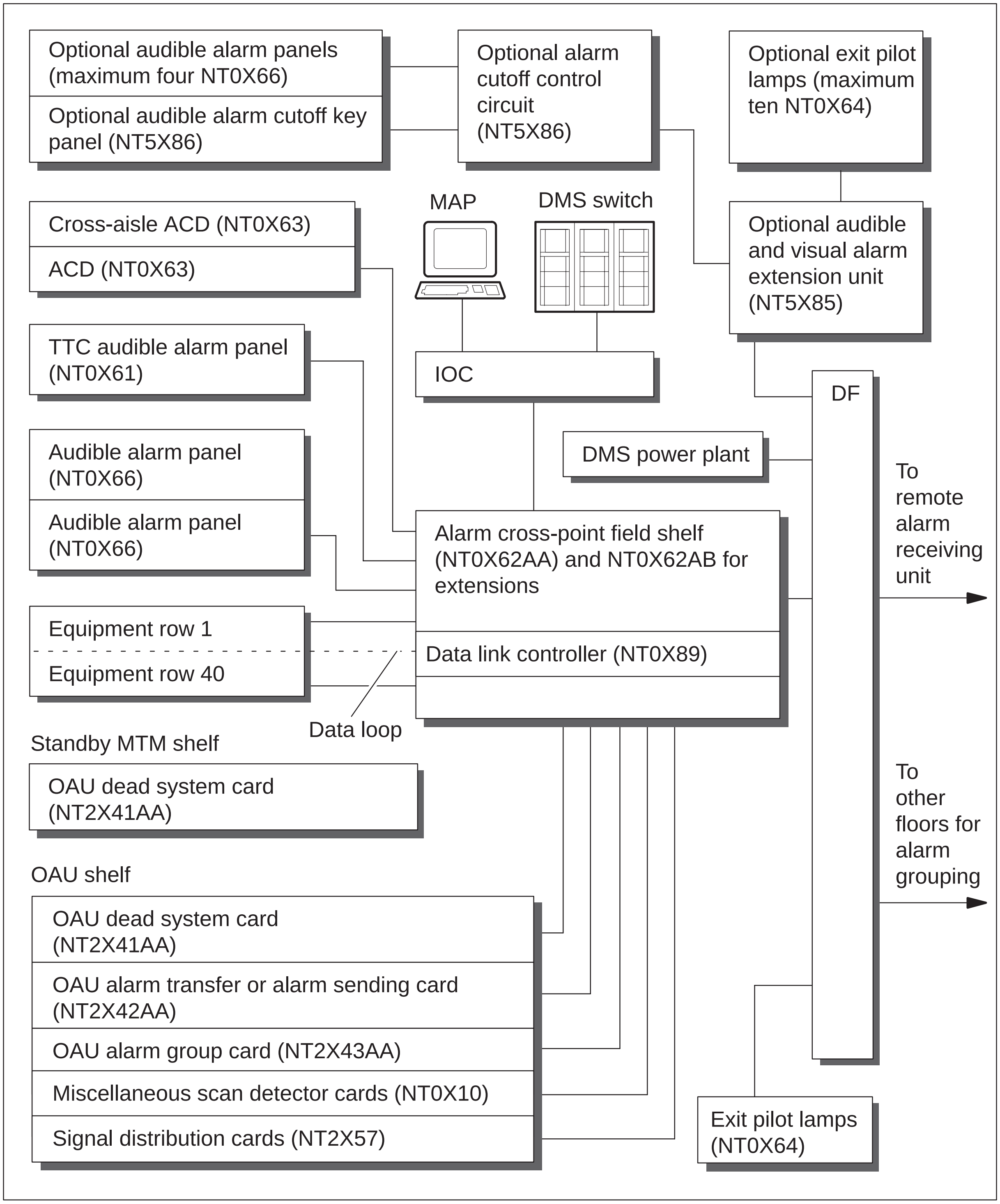
To perform the OAU backup functions, the standby MTM receives power from a different power distribution center (PDC) and battery feed (A/B supply) than the OAU. You assign the standby MTM to a different network module.

The control relays in the office alarm circuit #3 card are part of the OAU and DS alarm circuits. The office alarm circuit #3 card also provides a transformer for the ‘even’ aisle multiple of the local talk line circuit. The signal didtribution and scan detector cards provide scan (SC) and signal distribution (SD) points associated with the circuits in the office alarm circuit #3 card.

Alarm crosspoint field shelf

The OAU and standby MTM of the Version 1 OAS both connect to the other alarm system hardware. The OAU and standby MTM connect through the alarm crosspoint field shelf (NT0X62AA) and the distribution frame (DF). The connections between the various hardware modules in the Version 1 OAS are shown in Figure 2-2.

Figure 2-2
Version 1 alarm system interconnections



The alarm crosspoint field shelf (NT0X62AA) is in the top shelf position of the frame that contains the OAU shelf. The alarm crosspoint field contains vertical mounting plates. Forty-five connectors, a 200-pin terminal strip, and four data link control cards (NT0X89) are mounted. A front cover protects all of these components.

The alarm crosspoint field connects to the OAU through a wiring harness. The harness is in 11 connector plugs at the back of the OAU. At the crosspoint field, this harness connects to the appropriate connectors and to pins on the 200-pin terminal strip. Cable-to-terminal blocks on the DF connect to the terminal strip.

Alarm systems that require increased alarm detection capability use the crosspoint field shelf extension (NT0X62AB).

Connections to the other parts of the alarm system can be through connectorized cables plugged into the connectors on the crosspoint field. These connections can be through cables wired to pins at the rear of the connectors. These onnections can also be through the DF and the terminal strip. Interconnections are also made at the rear of the crosspoint field between connectors, the terminal strip, and the data link control cards. The data link control cards provide control relays for the office data loop system.

External alarms panels

For information on external alarms panels, see Chapter 4.

Alarms

Office alarm unit

In the Version 1 OAS, the alarm circuits are in the alarm circuit #3 (NT2X43) card. This card is on OAU and standby MTM shelves. Two scan points, ABOAUFL and ABMTMFL, on separate scan detector (NT0X10) cards, interact with the NT2X43 card to provide a route to CC to identify OAS system failures. The ABOAUFL scan point in the OAU shelf monitors the NT2X43 card in the standby MTM. The ABMTMFL scan point in the standby MTM monitors the NT2X43 card in the OAU shelf. The OAS generates an ABOAUFL or ABMTMFL alarm at the MAP terminal if the OAU or standby MTM shelf loses any of the following:

- –48V battery supply
- 130V dc supply for the remote alarm transfer circuit
- 130V ac, 20-Hz ringing supply for audible alarms
- communication with CC

Office Alarm System Version 2

This chapter contains information on office alarm system (OAS) Version 2. Chapter 6 describes the OAS alarms and alarm and control circuits.

In the Version 2 OAS, you can locate alarm circuit, scan, and signal detector cards in any MTM shelf in the office. Alarm equipment interconnections are through the alarm crosspoint shelf or the distribution frame (DF).

Some differences between OAS Versions 1 and 2 are as follows:

- Version 2 alarm functions in alarm circuit cards are partitioned differently.
- Version 2 systems incorporate most scan (SC) and scan detector (SD) functions on the alarm circuit cards.
- Version 2 systems offer additional functions like hardware diagnostic tests and loop closure. These functions operate external alarm equipment or transfer alarm indications to a maintenance center.

Version 2 OAS hardware and alarm indication devices

The following sections provide information on the main hardware components of the Version 2 OAS and the alarm indication devices mounted on these components.

Office alarm unit

The OAU of a Version 2 OAS is a regular maintenance trunk module (MTM) shelf or integrated services module (ISM) shelf. The OAU can be part of a complete alarm system for a small office (See Figure 4-1). The OAU can also be expanded to supply the full alarm system capabilities for a large office (See Figure 4-2). Table 3-2 contains examples of Version 2 equipment combinations.

The following cards provide the Version 2 alarm circuit features and functions:

- OAU dead system with unique audibles card (NT3X82AA), which contains the following:

- — 20-Hz ringing supply with the associated failure monitor and power transfer circuits
- — 60 IPM (interruptions per minute) interrupter circuit for the major alarm tone bar
- — signal distribution points for the MTM fail indicators
- — control relays that are part of the dead system alarm
- — audible alarm reset circuit and the DMS alarm
- — fused 48V power source for audible and visual indicators
- — local talk hybrid transformer
- — monitor circuit to check the accuracy of messages from central control (CC) to the peripheral modules (PM)

- OAU dead system with common audibles card (NT3X82AB), which contains the following:
  - — CC to peripheral message validity monitor circuit
  - — fused 48 V power source for audible and visual alarm indicators
  - — control relays for the common audible alarm
  - — audible alarm reset
  - — DMS alarm circuits
  - — part of the dead system alarm. 1
- OAU alarm transfer card (NT3X83), which contains the following:
  - — 130 V generator with an associated monitor circuit
  - — control relays for the remote alarm transfer circuit
  - — exit pilot lamps
  - — night alarm transfer circuit
  - — hardware minor alarm override for major and minor alarms that occur at the same time
- OAU alarm sending card (NT3X84), which contains control relays and a tone generator for sending a dead system indication over an operator verification trunk. The NT3X84 controls the relays for night alarm transfer and exit pilot circuits.
- OAU alarm group card (NT3X85), which contains control relays for the alarm grouping circuit

MTM alarm system circuits

In the Version 2 OAS, the OAU must contain an OAU dead system card (NT3X82). The SC and SD points that generate the OAU and dead system (DS) alarms are in the NT3X82. This card must be the same type as the equivalent card in the standby MTM or ISM. That is, the two cards must both be the common audible or the unique audible type. When you install unique audible type, the NT3X82 card in the standby MTM or ISM provides the following:

- backup for the 20-Hz ringing generator
- hybrid transformer for the ‘even’ aisle multiple of the local talk line circuit
- control relays which complete the circuits of the dead system alarm

To perform the OAU backup functions, the standby MTM or ISM receives power from a different power distribution center (PDC) and battery feed (A/B supply) than the OAU. You assign the standby MTM to a different network module.

Alarm cross-connect unit panel

In the Version 2 OAS, the alarm cross-connect unit (AXU) panel (NT3X89AA, NT3X89BA) replaces the alarm crosspoint field shelf (NT0X62). The AXU shelf is in the top provisionable shelf position directly above the OAU shelf. The AXU shelf is functionally similar to the Version 1 shelf. The AXU shelf uses connectorized cables for every equipment interconnection except for interconnections to the audible alarm panels. A screw-connect terminal strip makes these interconnections. The AXU panel contains data link control cards (NT0X89). Chapter 6 covers data link control cards

The NT3X89BA AXU is a version for –60V applications. The NT3X89BA does not support the data loop control (DLC) function.

In some applications, Version 2 alarm equipment interconnects through the DF without the use of an AXU shelf. Figure 4-1 shows his configuration.

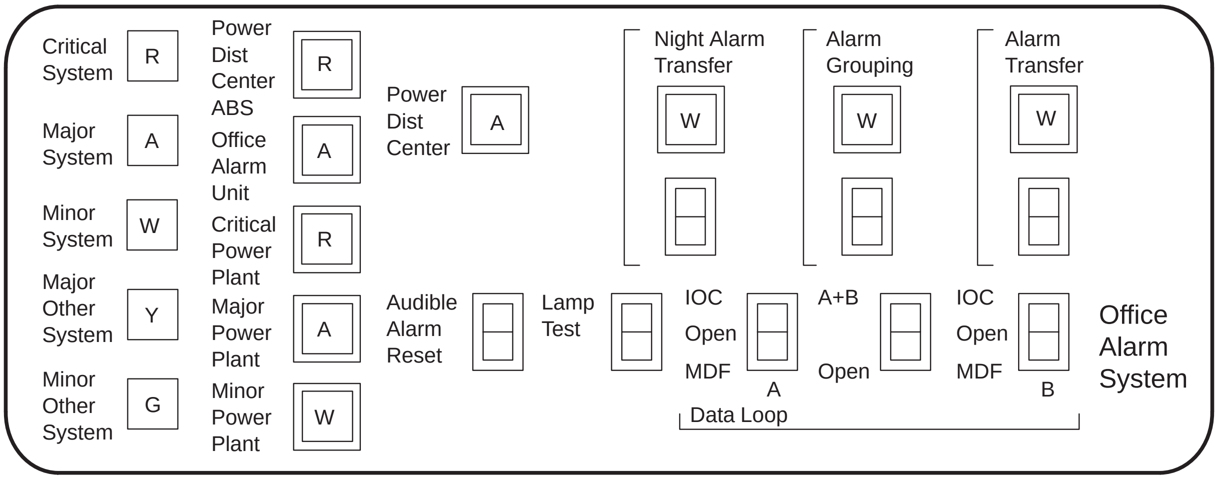
Figure 4-2 shows the equipment interconnections for a large office alarm system. These interconnections use the Version 2 OAS components and an AXU shelf.

Alarm control and display panel

The alarm control and display (ACD) panel (NT0X63AA) is an important component of the OAS. Figure 3-1 shows this panel. The alarm control and display panel is physically separated from the OAU and located at the MAP terminal for operational support. The ACD has lamps that display the type

and class of alarms that the alarm system detects. Switches provide manual control of alarm system facilities. Table 3-1 contains descriptions of the functions of the lamps and switches on the ACD.

Figure 3-1
Alarm control and display panel



Legend: Lamp A = amber
Lamp G = green
Lamp R = red
Lamp W = white
Lamp Y = yellow

Table 3-1
Alarm control and display functions

Designation	Device	Function
Critical System	Lamp (red)	Signals a critical system failure
Major System	Lamp (amber)	Signals a major system failure
Minor System	Lamp (white)	Signals a minor system failure
Major other System	Lamp (yellow)	Signals a critical or major alarm in another system
Minor other system	Lamp (green)	Signals a minor alarm in another system
Power Dist Center ABS	Lamp (red)	Signals an alarm battery supply failure at a PDC

—continued—

Table 3-1
Alarm control and display functions (continued)

Designation	Device	Function
Office Alarm Unit	Lamp (amber)	Signals an alarm system hardware failure at the OAU or the MTM
Critical Power Plant	Lamp (red)	Signals a critical DMS Power plant failure
Major Power Plant	Lamp (amber)	Signals a major DMS power plant failure
Minor Power Plant	Lamp (white)	Signals a minor DMS power plant failure
Power Dist Center	Lamp (amber)	Signals an office battery supply failure at a PDC
Night Alarm Transfer	Switch (locking)	Activates TTC night alarm transfer. For more information, refer to Chapter 6.
	Lamp (white)	Indicates TTC night alarm transfer is active
Alarm Grouping	Switch (locking)	Activates alarm grouping. For more information refer to Chapter 6.
	Lamp (white)	Indicates alarm grouping is active
Alarm Transfer	Switch (non-locking)	Activates or cancels remote alarm transfer. For more information, refer to Chapter 6.
	Lamp (white)	Signals Remote Alarm Transfer is in effect
Audible Alarm Reset	Switch (non-locking)	Silences audible alarms. For more information, refer to Chapter 6.
Lamp Test	Switch (non-locking)	Momentarily lights all lamps on the ACD and any ACD multiples
Data Loop A	Switch (three-position)	Routes A aisle multiple to IOC port A, or MDF data loop jacks, or opens the loop. For more information, refer to Chapter 6.

—continued—

Table 3-1
Alarm control and display functions (continued)

Designation	Device	Function
Data Loop B	Switch (three-position)	Routes B aisle multiple to IOC port B, or MDF data loop jacks, or opens the loop. For more information, refer to Chapter 6.
Data Loop A + B	Switch (locking)	Joins A and B aisle multiples. The IOC port B is disconnected in this configuration. For more information, refer to Chapter 6.
—end—		

External alarms panels

For information on external alarms panels, see Chapter 4.

Alarms

Office alarm unit (OAU)

In the Version 2 OAS, the primary alarm circuits are in the OAU dead system with unique audibles (NT3X82) card. This card is on OAU and standby MTM or ISM shelves. Two scan points on the NT3X82 cards, ABOAUFL and ABMTMFL, monitor each other to provide a route to CC to identify OAS system failures. The ABOAUFL scan point in the OAU shelf monitors the NT3X82 card in the standby MTM or ISM. The ABMTMFL scan point in the standby MTM or ISM monitors the NT3X82 card in the OAU shelf. The OAS generates an ABOAUFL or ABMTMFL alarm at the MAP terminal if the OAU or standby MTM shelf loses any of the following:

- –48V battery supply
- 130V dc supply for the remote alarm transfer circuit (if active)
- 130V ac, 20-Hz ringing supply for audible alarms
- communication with the message switch (MS)

In some small offices, only the OAU contains the NT3X82 card. In these offices, if the NT3X82 detects any of the alarm conditions listed above, the alarm system generates the dead system alarm because there is no backup NT3X82.

Version 2 dead system and OAU alarms

The scan and signal distribution points that generate the dead system and OAU alarms are in NT2X82 cards in the OAU and standby MTM or ISM. This configuration removes the requirement for separate scan and signal

distribution cards. The NT3X82 cards contain all the required control relays.

Version 2 OAS equipment combinations

Table 3-2 shows equipment combination examples for a remote line module (RLM), a small DMS-100 Family office, and a large DMS-100 Family office.

Table 3-2
Examples of Version 2 OAS equipment combinations

System requirements	Alarm system for RLM	Alarm system for small office	Complete alarm system for large office
Equipment located in OAU shelf	NT2X57AA, NT0X10AA	NT3X82AB, NT2X57AA, NT0X10AA	NT3X82AA, NT3X83AA or NT3X84AA, NT3X85AA
		NT3X84AA	NT2X57AA (2)
			NT0X10AA (6)
Equipment located in standby MTM	none	NT3X82AB	NT3X82AA
Related equipment	NT0X63AC	NT0X63AC	NT3X89AA, NT0X63AA
			NT0X63AB, NT0X64AA (2), NT0X66AA (2), NT0X61AB
Related illustration in this NTP	none	Figure 3-1	Figure 3-2

Note: Numbers in parentheses indicate quantities required, if other than one.

OAS Version 2 Enhanced Alarm System

This chapter contains information on the Office Alarm System (OAS) Version 2 Enhanced Alarm System (EAS). Chapter 6 describes the OAS alarms and alarm and control circuits.

EAS features

In the EAS, the power for office alarms is separate from the power for the power distribution center (PDC). The separate power feeds ensure that audible and visual alarm indication occurs within two seconds of the start of a critical alarm condition.

The EAS is an enhancement of the Version 2 OAS. The EAS provides all the functions of the Version 2 OAS along with the following:

- independent power feeds to the
  - trunk module equipment (TME) frame that contains the office alarm unit (OAU)
  - trunk module equipment (TME) frame that contains the standby MTM or ISM
  - alarm battery supply (ABS) from the power board that serves DMS-100 Family equipment
- audible and visual alarm indication within two seconds of the start of a critical alarm condition
- dedicated (remote alarm) contacts for the use of external alarm scanners for
  - critical power plant alarm indication
  - dead system alarm indication
- internal detection of the loss of power to one or more PDCs
- internal low voltage detection to indicate when power board batteries are discharge
- frame fail and end of aisle lamp indication loss of power to one or more PDCs

EAS hardware and alarm indication devices

The following sections describe the main hardware components of the EAS and the alarm indication devices mounted on these components.

Office alarm unit

The OAU of an EAS is a regular maintenance trunk module (MTM) shelf. The OAU can be part of a complete alarm system for a small office (See Figure 4-1). The OAU can also be expanded to supply the full alarm system capabilities for a large office (See Figure 4-2). The following sections describe the OAS equipment available. Table 4-2 contains descriptions of OAS capabilities.

Figure 4-1
Alarm system for a small office

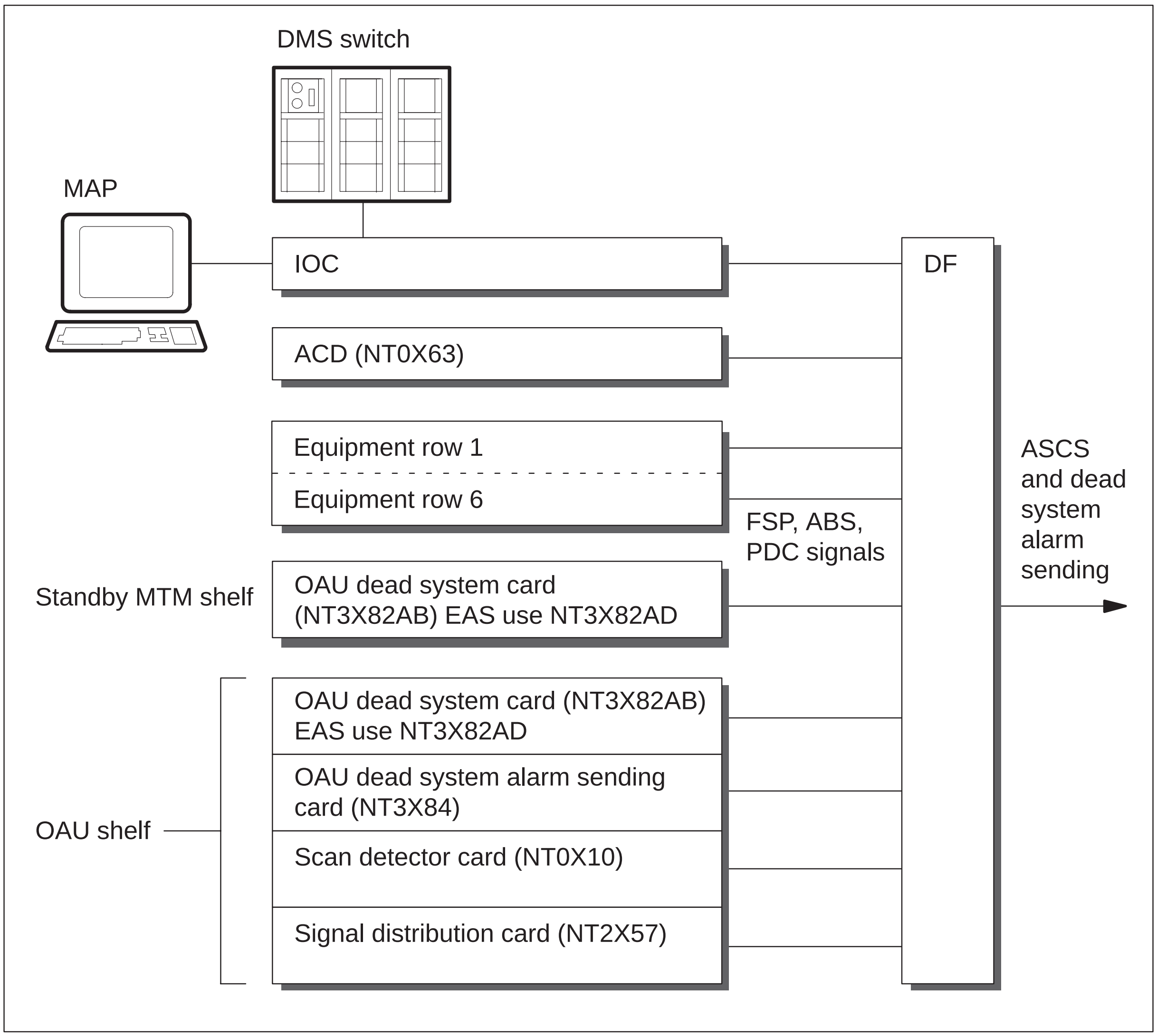
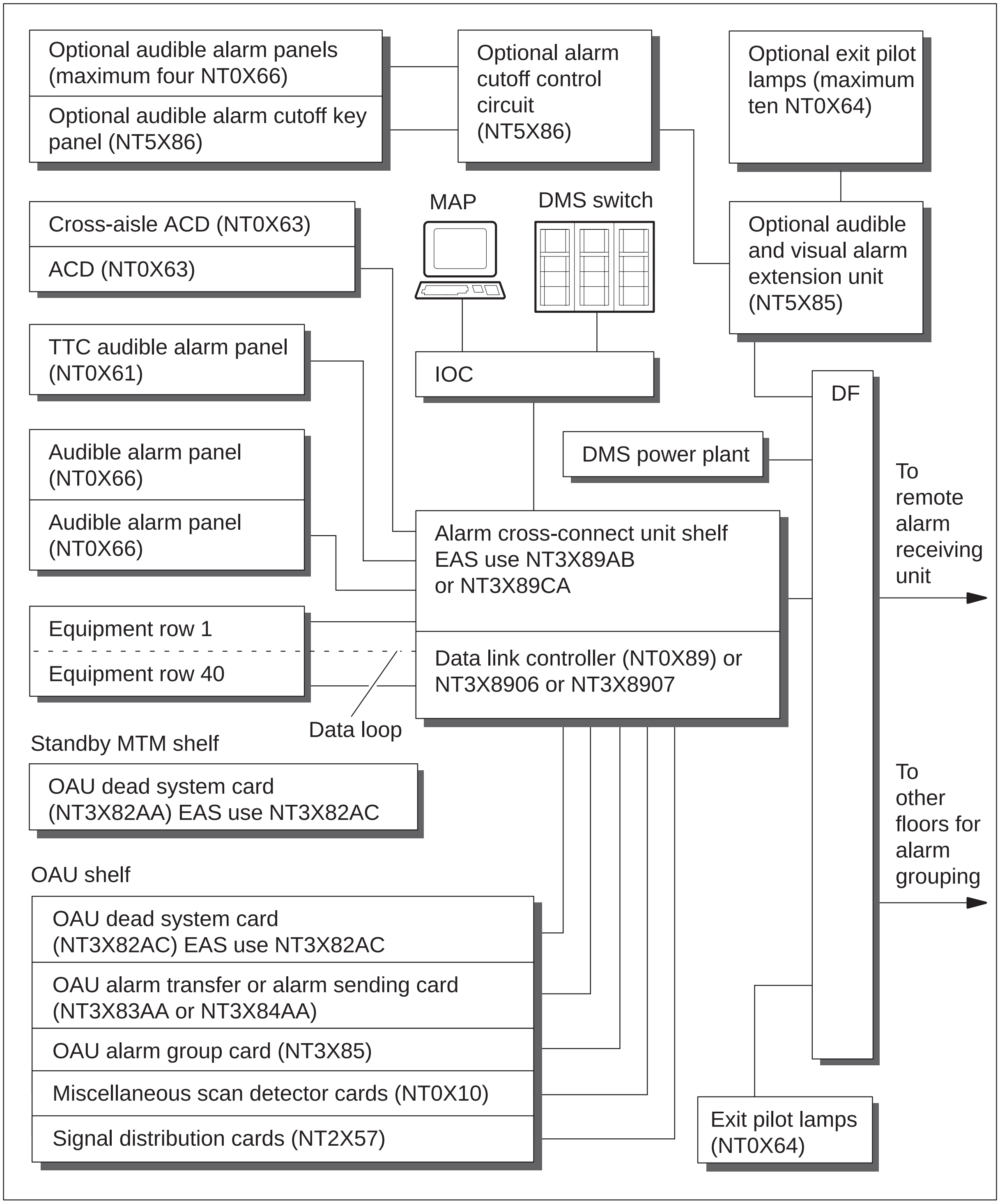


Figure 4-2
Alarm system for a large office



In the EAS OAU, the NT3X82AC and AD cards replace the NT3X82AA and AB cards. These new cards are backward compatible and provide the additional features listed above. The NT3X82AA and NT3X82AB cards do not provide these features.

Chapter 3 lists the features common to the AA, AB, AC, and AD versions of the NT3X82 card.

MTM alarm system circuits

In the EAS, the OAU and standby MTM must obtain power from feeds other than A or B. The OAU and standby MTM must be powered by two additional feeds (C and D) that are separate from the standard A and B feeds.

Alarm cross-connect unit panel

You must use the NT3X89AB, NT3X89BA, or NT3X89CA alarm cross-connect unit (AXU) panel for the EAS. These AXU panels are physically the same as the NT3X89AA, except for the wiring changes to support the additional EAS functions.

The NT3X89CA is a modernized version of the NT3X89AB. The NT3X89CA uses the following daughter boards for the data loop control (DLC) function:

- NT3X8906 for –48V applications
- NT3X8907 for –60V applications

The DLC function is not available on the NT3X89BA (–60V) panel.

Audible alarms

The activation of the audible alarms can be on-site or the remote alarm transfer circuit can transfer the audible alarms to a remote monitoring location. For more information on audible alarms and alarm circuits, see Chapter 6. The on-site audible signaling devices mount on two audible alarm panels. One panel, the NT0X66, is the main audible alarm panel for DMS-100 Family switches. The other panel, the NT0X61, is the optional TTC audible alarm panel for the trunk test center (TTC) in toll offices.

Normally, an office contains a maximum of two main audible alarm panels. Office size and configuration determine the number of main audible alarm panels used. For example, you use an additional audible alarm panel for a DMS power plant located on another floor. Extended audible alarm capability is also available. For more information, see Alarm extension circuits section later this chapter. The audible alarm panels are wall- or column-mounted.

The main audible alarm panel contains the following signaling devices:

- critical bell, a loud bell that indicates the following alarm conditions:
  - dead system alarm,
  - critical DMS system equipment failure
  - critical DMS power plant failure
  - critical system or power plant failure in another system (if alarm grouping is active)
- major chime, a loud tone bar struck at 60 IPM (interruptions per minute) signaling, that indicate the following alarm conditions:
  - major DMS system failure
  - major DMS power plant failure
  - frame supervisory panel (FSP) alarm on any equipment aisle
  - major equipment failure in another system (if alarm grouping is active)
- alarm battery subset, a loud telephone ringer (two bells with resonators), that indicates the following alarm conditions:
  - alarm battery supply failure at a PDC
  - battery failure at the OAU or standby MTM
  - failure of an internal supply circuit at the OAU or standby MTM (130 V supply or 20-Hz ac ringing supply)
  - a loss of communication between CC and the OAU or standby MTM
- minor alarm subset - a loud telephone ringer (two bells without resonators) that indicates the following alarm conditions:
  - minor DMS system equipment failure
  - minor DMS power plant failure
  - minor equipment failure in another system (if alarm grouping is active)
  - incoming call on a 101 communication test line at the TTC (if night alarm transfer is active)

The TTC audible alarm panel provides a TTC chime that signals an incoming call on a 101 communication test line.

Visual alarm indications and manual controls

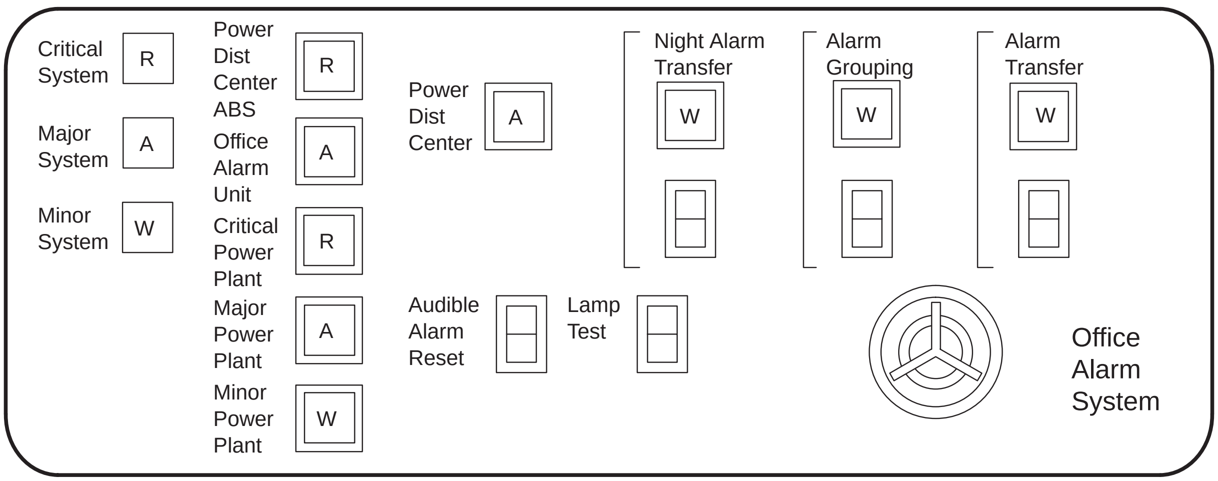
The OAS hardware includes a number of devices that provide visual alarm indications and manual controls. These devices are in addition to the UI (User Interface) for system- and hardware-detected alarms. The VDU

(visual display unit) provides the UI at the MAP terminal. Lamps and control switches mount on panels located at the MAP and at the main exit doors. You can install additional panels (optional) at other office locations. Each equipment aisle also has lamps that indicate local alarm conditions.

ACD panel with common audible alarm

Figure 4-3 shows the ACD panel with common audible alarm. Table 4-1 contains descriptions of the functions of the lamps and switches on the ACD panel with common audible alarm.

Figure 4-3
ACD panel with common audible alarm



Legend: Lamp A = amber
Lamp G = green
Lamp R = red
Lamp W = white
Lamp Y = yellow

Table 4-1
Functions of ACD panel with common audible alarm

Designation	Device	Function
Critical System	Lamp (red)	Signals a critical system failure
Major System	Lamp (amber)	Signals a major system failure
Minor System	Lamp (white)	Signals a minor system failure
—continued—		

Table 4-1
Functions of ACD panel with common audible alarm (continued)

Designation	Device	Function
Power Dist Center ABS	Lamp (red)	Signals an alarm battery supply failure at a PDC.
Office Alarm Unit	Lamp (amber)	Signals an alarm system hardware failure at the OAU or standby MTM
Critical Power Plant	Lamp (red)	Signals a critical DMS power plant failure
Major Power Plant	Lamp (amber)	Signals a major DMS power plant failure
Minor Power Plant	Lamp (white)	Signals a minor DMS power plane failure
Power Dist Center	Lamp (amber)	Signals an office battery supply failure at a PDC
Night Alarm Transfer	Switch (locking)	Initiates TTC Night Alarm Transfer. For more information, refer to Chapter 6.
	Lamp (white)	Indicates TTC night alarm transfer is active
Audible Disable	Switch (locking)	Disables the audible alarm device
	Lamp (red)	Indicates audible alarm device is disabled
Alarm Transfer	Switch (non-locking)	Activates or cancels remote alarm transfer. For more information, refer to Chapter 6.
	Lamp (white)	Indicates remote alarm transfer is active
Audible Alarm Reset	Switch (non-locking)	Silences audible alarms. For more information, refer to Chapter 6.
Lamp Test	Switch (non-locking)	Momentarily lights all lamps on the ACD and any ACD multiples
—end—		

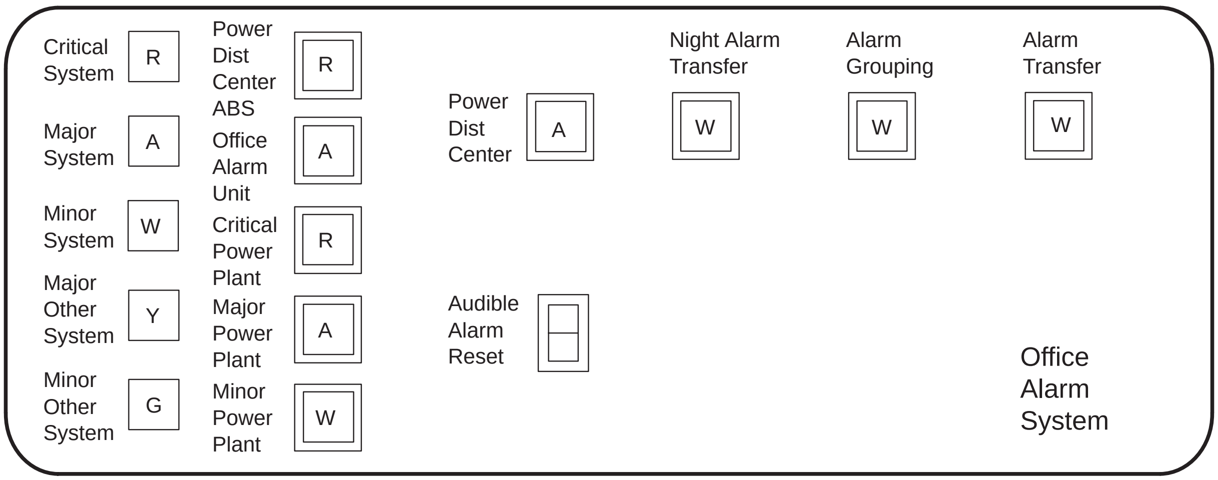
Alarm display panel

The alarm display panel (NT0X63AB) is a version of the ACD that has all switches except the audible alarm reset removed. Figure 4-4 shows the alarm display panel.

As an option, you can install up to two alarm display panels, for example, for cross-aisle visual alarms. The function of the lamps and the switch on

the alarm display panel are the same as those on the ACD. Table 4-1 describes these functions.

Figure 4-4
Alarm display panel



Legend: Lamp A = amber
Lamp G = green
Lamp R = red
Lamp W = white
Lamp Y = yellow

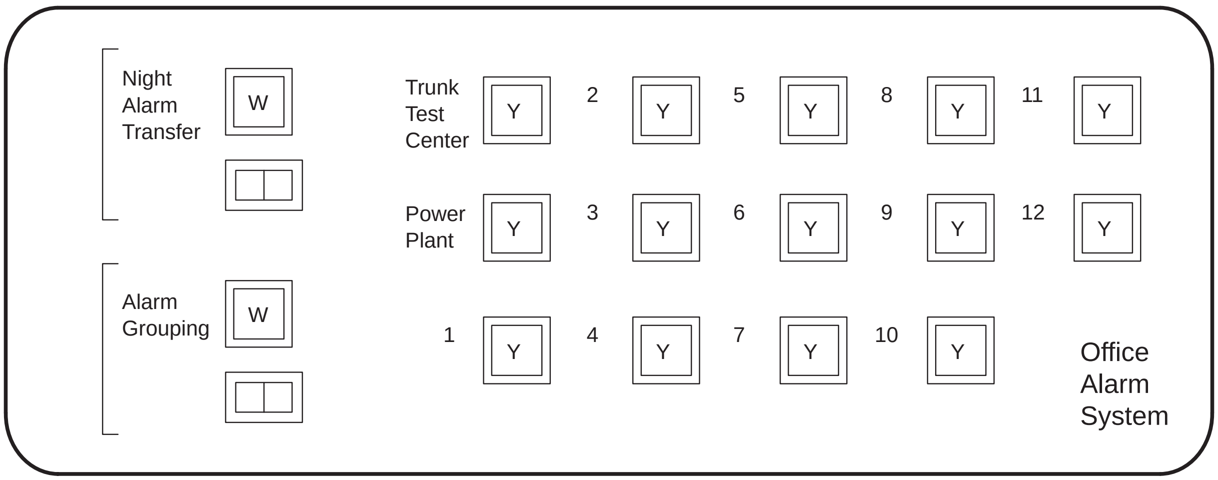
Exit alarm panel

The exit alarm panel (NT0X64) is near the main exit door on each floor in a multi-floored DMS office. Figure 4-5 shows this panel. Normally, you can install a maximum of four exit alarm panels in a DMS office. For more information, refer to the Alarm extension circuits section in this chapter. The exit alarm panels direct maintenance personnel to the area or floor of the office where detection of the alarm condition occurred. The exit alarm panels provide remote controls for the night alarm transfer and alarm grouping circuits. The functions of the lamps and switches on the exit alarm panels are as follows:

- The night alarm transfer switch and lamp have the same functions as these devices on the ACD. These functions are described in Table 4-1.
- The alarm grouping switch and lamp have the same functions as these devices on the ACD. These functions are described in Table 4-1.
- The yellow power plant lamp lights to signal an alarm condition in the DMS power plant.

- The yellow trunk test center lamp lights to signal an incoming call on 101 test line in the TTC. The lamp lights if night alarm transfer is active.
- The yellow exit pilot lamps are numbered 1 through 12. The pilot lamps are available for each floor with an alarm reporting system, DMS floor, or non-DMS floor. An alarm origination on a specified floor lights the exit pilot lamp representing that floor on each exit alarm panel.

Figure 4-5
Exit alarm panel



Legend: Lamp W = white
Lamp Y = yellow

Equipment aisle visual alarms

Each equipment aisle in the DMS office has the red end-aisle pilot lamps. These lamps light if an FSP detects a fault in the aisle. Each FSP in an aisle has a frame fail lamp that lights to indicate which frame in the aisle generates the alarm. The FSP for frames with cooling units have a fan fail lamp. Chapter 6 contains a description of the circuits associated with the FSP alarms.

Alarm extension circuits

You require alarm extension circuits when audible or visual alarm requirements are not met by the two main audible panels and four exit alarm panels normally available.

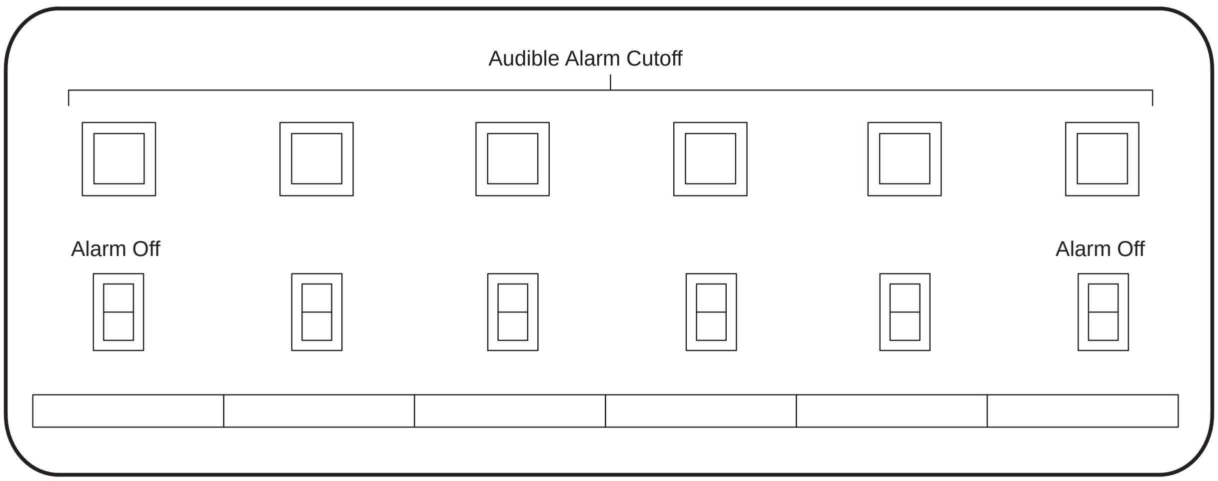
The audible and visual alarm extension circuit (NT5X85AA) is an applique circuit. When mounted on the miscellaneous frame (NT0X02AB), this circuit allows up to four additional audible alarm panels. This circuit also

allows the addition of up to ten additional exit alarm panels to the alarm system.

The extension circuit permits selective control of the audible alarm panels. You require control when audible alarm panels are configured with the audible alarm cutoff control circuit (NT5X86AA) and the audible alarm cutoff key panel (NT5X86AB). The audible alarm cutoff key panel is located at the MAP terminal. The audible alarm cutoff key panel allows you to selectively disable the two main audible alarm panels and the four extended audible alarm panels. Figure 4-6 shows the audible alarm cutoff key panel.

When you extend audible alarm capability, a ringing generator must be available for the extension circuit.

Figure 4-6
Audible alarm cutoff key panel



Power distribution frame upgrades

To upgrade the FSP in a PDC to support the EAS function, you use the NT0X42XC conversion kit. This kit includes an NTFX05AA card to detect outages on the A or B power feeds at the PDC.

Office Alarm System features

Table 4-2 list the features of various OAS configurations.

Table 4-2
Features of OAS

System	Features
Alarm system for a remote line module (RLM)	Common audible alarm with reset and disable and the following visual alarm indicators: • critical - both remotely located line modules of a pair are system busy • major - a ringing generator or bus interface card fault is present at the site
Alarm system for a small office	A VDU display of the following: • a maximum of six equipment rows • software remote Alarm Sending and Checking (ASCS) • hardware dead system alarm sending over operator trunks • alarm loop closures to distributing frame • common audible alarm • visual alarm indicators • dead system alarm with audible alarm reset and disable.

—continued—

Table 4-2
Features of OAS (continued)

System	Features
Complete alarm system for a large office	A VDU display of the following: • a maximum of 40 equipment rows • alarm loop closures to distributing frame • visual alarm indicators and controls • remote alarm transfer • alarm grouping • standard audible alarms with reset • office data loop system • local talk lines • exit pilot displays • TTC audible alarm • 14 spare SD points • 36 spare scan points • cross aisle visual alarm display
—end—	

Low Power Alarm system

The Low Power Alarm (LPA) system is a monitor and report system that provides audible and visual alarm indications for DMS-100 Family office equipment and any related non-DMS equipment connected to the office.

The LPA system replaces the following Office Alarm System (OAS) versions:

- Version 1
- Version 2
- Version 2 Enhanced Alarm System (EAS)

The LPA system is backwards compatible with the Version 2 and Version 2 EAS systems only.

Office alarm system

The main purpose of the office alarm system (OAS) is to detect and report failures and service degradations. The alarm system is a group of hardware devices and software modules that provide the following:

- visual (lights) and audible (tones) indication of alarm conditions
- transfer of critical, major, and minor alarms to remote sites
- data loops for a portable MAP terminal
- battery power feed for telephone headset communication within the office

The alarm system uses scan (SC) points and signal distribution (SD) points to monitor and report the alarm status of each equipment lineup, to a maximum of 40 lineups. Scan points detect voltage, ground, or closed-loop conditions. Signal distribution points transfer alarm indications to alarm panels and/or a T101 link. Hardware switch settings and datafill in data schema tables ALMSCGRP, ALMSC, ALMSDGRP, and ALMSD define the SC and SD points.

Visual display units (VDU) provide strategically located lights for alarm indication. These VDU also provide manual controls for alarm transfer, (audible) alarm silencing, and the capability to test alarm indicator lights.

Low Power Alarm system

The following sections contain a description of the LPA system functions and components.

Low Power Alarm System features

The LPA system provides the following:

- low voltage power supplies to replace the high voltage power supplies in previous alarm system versions
- all audible panels (of earlier alarm system versions) combined into one unit
- all visual display and control panels (of earlier alarm system versions) combined into one unit
- low power audible electronic devices (on-board circuits) to generate tones
- smaller and lighter alarm panels
- inactive timing circuit (IATC) provided on the NT3X82 card
- office voice loop
- office data loop
- conversion kits to convert earlier alarm system versions to an LPA system

Inactive timing circuit clock

The IATC clock is a mechanical device that displays the length of a dead system condition in hours, minutes, and seconds. A rechargeable lithium battery powers the IATC clock.

Office data loop

The LPA system provides the capability to connect a MAP terminal anywhere on office equipment frames or cabinets through the following:

- port jacks in the frame supervisory panels (FSP) or modular supervisory panels (MSP)
- main distribution frame (MDF)

You can access provisioned input/output controller (IOC) ports through manual switches on the ACD panels.

Office voice loop

The LPA system supports voice communication anywhere in the office equipment frames or cabinets. The LPA system also provides the capability to interface a standard POTS (plain old telephone service) line instead of a local talk circuit.

Low Power Alarm system components

The following sections contain information on LPA system hardware components.

Office alarm unit

The office alarm units (OAU) of the LPA system are provisioned on integrated services module (ISM) shelves. The primary OAU, backed up by the secondary (standby) OAU, provides the dead system alarm function. The dead system alarm function is the only duplicated LPA system function. None of the other alarm functions are supported by more than one ISM.

Both ISMs communicate with central control (central message controller [CMC] or message switch [MS]) through an internal message system link via the network.

The LPA system OAU uses the following dedicated cards:

- LPA dead system with audibles card (NT3X82BA), which has the following features:
  - replaces the 20-Hz ringing supply with a low voltage analog signal that complies with UL, CSA, DEU (Germany), EN (Europe), and NEC requirements
  - monitor and transfer circuits
  - improved transformer circuit for the local talk line system, to allow one shelf slot provisioning
  - low power interface to audible and visual display panels
  - common and unique audibles, –48V, and –60V versions combined into one card
  - OAU alarm, including the dead system alarm
  - audible alarm reset
  - self-monitor and self-test circuits
  - IATC
- alarm transfer and sending card (NT3X83BA), which combines alarm transfer or sending and checking functions in one card

The NT3X82BA and NT3X83BA cards are powered by the following power sources on the ISM backplane: A, B, and ABS. For a detailed description of the NT3X82BA and NT3X83BA cards, see *Hardware Description Manual*.

Hardware

The following table lists LPA system components and identifies earlier alarm system components replaced by the LPA system components.

Table 5-1
LPA system components

LPA component PEC	Description	Replaces
NT0X00LA	LPA system description documentation	
NT0X00LB	Version 2 to LPA upgrade kit	
NT0X63LA	Alarm control and display (ACD) panel	NT0X63AA, NT0X63AC, NT0X63AD, NT0X63AE, NT0X63AF, NT0X63KA
NT0X63LB	Alarm display (AD) panel	NT0X63AB
NT0X63MA	central alarm display (CAD) panel	NT0X64AA, NT0X64AB, NT5X72AA, NT5X72AB
NT0X63MB	Alarm cutoff (ACO) panel	NT5X86AA to AD
NT0X66CA	Audible alarms panel	NT0X61AA, NT0X61AB, NT0X61AC, NT0X66AA, NT0X66AB, NT0X66BA, NT0X66KA
NT3X82BA	LPA dead system and audibles card	NT3X82AA to AH, NT3X82AJ, NT3X82AK, NT5X69AA, NT5X69AB

Table 5-1
LPA system components (continued)

LPA component PEC	Description	Replaces
NT3X83BA	Alarm transfer/sender circuit card	NT3X84AA. NT3X84AB
NT3X89EA	Alarm cross-connect (AXU) panel	NT3X89CA

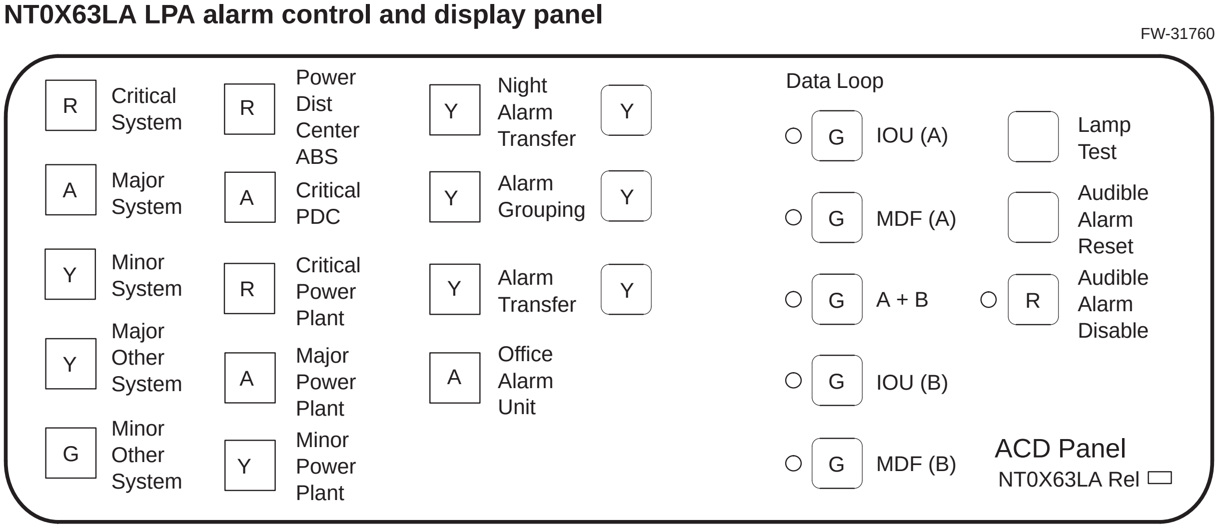
If Version 2 and EAS panels are used with LPA system components, the following rules apply:

- The Version 2 and EAS panels must be physically located after the LPA panels.
- The J1 shorting strap on the AXU panel must be removed.

Visual alarm panels Four alarm panels (NT0X63LA, NT0X63LB, NT0X63MA, and NT0X63MB) replace 15 units in earlier alarm system versions. Table 5-1 identifies the units replaced. The NT0X63LA (see Figure 5-1) provides the ACD functions and the NT0X63LB (see Figure 5-2) provides the AD functions. Both versions use the same printed circuit board. The differences between the two versions are as follows:

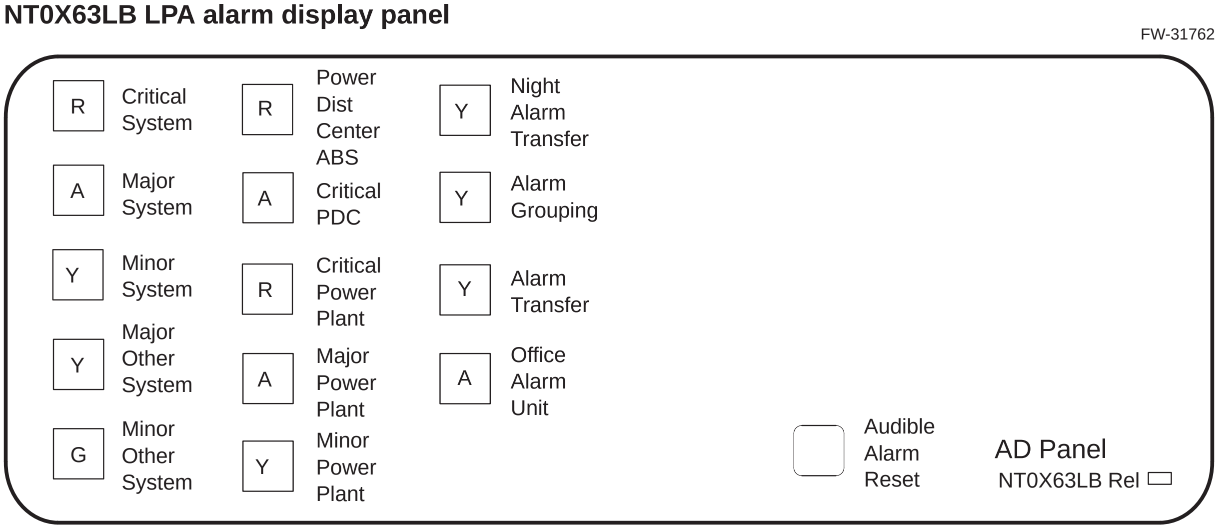
- The NT0X63LA contains a volume control.
- The NT0X63LB does not contain the switches that are on the NT0X63LA.

Figure 5-1
NT0X63LA LPA alarm control and display panel



Legend: Lamp A = amber
Lamp G = green
Lamp R = red
Lamp Y = yellow

Figure 5-2
NT0X63LB LPA alarm display panel



Legend: Lamp A = amber
Lamp G = green
Lamp R = red
Lamp Y = yellow

The following table contains explanations for the LED labels on the ACD and AD panels.

Table 5-2
LED labels

LED label	Explanation
Critical System	Critical DMS failure
Major System	Major DMS failure
Minor System	Minor DMS failure
Major Other System	Major non-DMS failure
Minor Other System	Minor non-DMS failure
Power Dist. Center ABS	Alarm battery supply failure at PDC
Office Alarm Unit	NT3X82 in OAU failed because of a card, shelf, or power failure
Critical Power Plant	Critical failure in the power plant
Major Power Plant	Major failure in the power plant
Minor Power Plant	Minor failure in the power plant
Power Dist. Center	Critical failure at the power distribution center
Night Alarm Transfer	Night alarm transfer activated by operation of switch on ACD panel
Alarm Grouping	Alarm grouping activated by operation of switch on ACD panel
Alarm Transfer	Alarm trnsfer activated by operation of switch on ACD panel
CA Volume Reduced	Critical alarm buzzer volume reduced by operation of switch on ACD panel

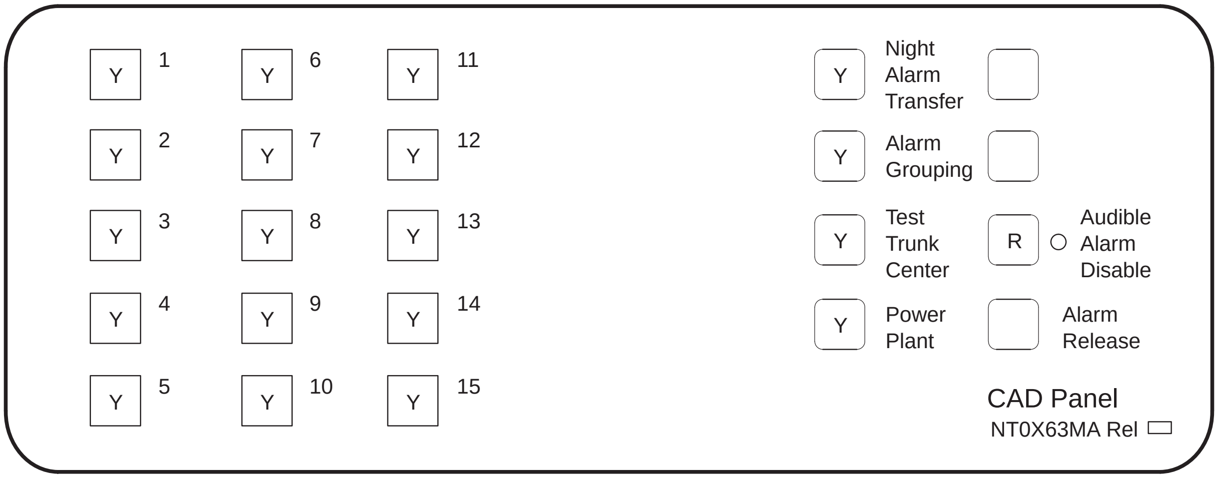
On the NT0X63LB panel a resettable fuse will open if there is an electrical short circuit. To restore operation to the panel, disconnect the C00 cable for 30 seconds. If the panel does not return to service, contact your next level of support.

For a detailed description of the NT0X63LA and NT0X63LB panels, see *Hardware Description Manual*.

The NT0X63MA (see Figure 5-3), provides the exit alarm and the central alarm display functions that are associated with MDF connections in earlier alarm system versions. You use the NT0X63MB (see Figure 5-4) to deactivate the audible alarms panels.

Figure 5-3
NT0X63MA exit alarms and audible cutoff panel

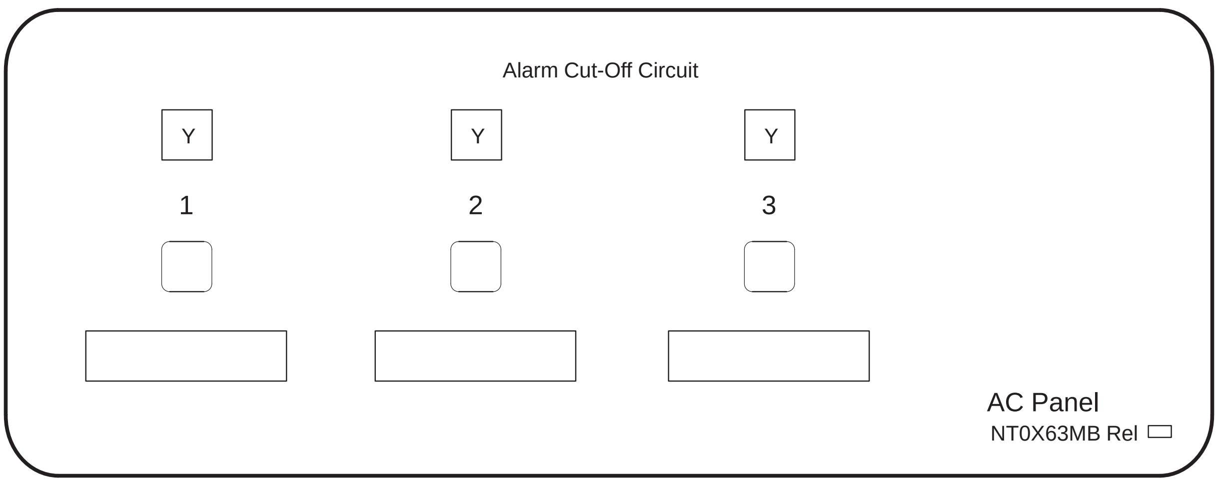
FW-31761



Legend: Lamp R = red
Lamp Y = yellow

Figure 5-4
NT0X63MB audible cutoff panel

FW-31763



Legend: Lamp Y = yellow

For a detailed description of the NT0X63MA and NT0X63MB panels, see *Hardware Description Manual*.

Audible alarms panel The NT0X66CA audible alarms panel replaces seven units in earlier alarm system versions. Table 5-1 identifies the units replaced. The LPA system audible alarms panel contains the following:

- mid-range 8-ohm speaker

- digital circuits which allow the unit to provide the following:
  - — unique tones
  - — test trunk center (TTC) chimes

You can combine the NT0X66CA with any of the (older) alarm system units listed in the previous paragraph with the same office configuration. However, the NT0X66CA input signals must be driven from separate SD points. If the NT0X66CAinput signals are combined on the same SD points, the large inductive voltages of the older mechanical units will damage the NT0X66CA panel.

For a detailed description of the NT0X66CA panel, see *Hardware Description Manual*.

Alarm cross-connect (AXU) panel The NT3X89EA AXU panel contains six additional circuit paths. The additional circuit paths provide the following:

- data loop path that remains active if the OAU fails.
- duplicated power source for peripheral alarms panels
- frame ground signal for peripheral alarms panels

CAUTION
Service interruption
If you use the NT3X89EA in configurations with Version 2 or Version 2 EAS equipmment, disconnect the J1 shorting strap. Failure to disconnect the J1 strap could result in service interruption or damage to equipment.

The NT3X89EA contains a J1 shorting strap. You must remove this shorting strap if you use the NT3X89EA in configurations with Version 2 or Version 2 EAS equipment.

For a detailed description of the NT3X89EA panel, see *Hardware Description Manual*.

Alarm and control circuits

This chapter contains information on the alarms and the alarm and control circuits of the Office Alarm System (OAS).

Alarms

Office alarm unit alarms

The alarm system generates the ABOAUFL (office alarm unit) or ABMTMFL (standby MTM or ISM) alarm when any of the following alarm conditions occurs:

- loss of -48V office battery supply to the office alarm unit (OAU) or standby maintenance trunk module (MTM) or integrated services module (ISM) shelf
- failure of an NT3X82 card
- loss of communication between central control (CC) and the OAU or standby MTM or ISM shelf

Scan point ABMTMFL in a scan card (NT0X10) in the OAU monitors the alarm circuit of the standby MTM or ISM shelf. A second scan point, ABOAUFL, in another scan card in the standby MTM or ISM monitors the alarm circuit of the OAU. The system generates the OAU alarm when either scan point detects the release of an alarm relay in the alarm circuits of the OAU or standby MTM (or ISM).

To verify message switch (MS) activity state, the MS sends a signal to the alarm cards in the OAU and standby MTM or ISM about every five seconds. If the alarm cards in the OAU or standby MTM (or ISM) do not receive this message, the alarm system sets a signal distribution (SD) point to indicate a loss of service. If both alarm cards detect a loss of service state, the alarm system sets additional SD points to to generate the dead system alarm (DSA) described in the next section.

Dead system alarm (DSA)

The alarm system hardware generates the DSA. This alarm indicates a loss of call processing capability in the DMS office. When a dead system condition occurs, the DSA hardware sounds the critical alarm bell and lights

the critical system lamp on the alarm control and display panel (ACD) to alert operating company personnel.

The alarm system hardware generates the dead system alarm when the alarm circuits of the OAU and standby MTM or ISM detect a loss of communication with CC. Multiple faults in the hardware of the message system can cause this alarm condition. A loss of sanity in the CC software can also cause this alarm condition. These conditions affect call processing and result in a loss of communication. The loss of communication has the following impact:

- The generation of an alarm by the alarm system software in the CC cannot occur in the normal way.
- If the message system has multiple faults, the affected maintenance subsystem can detect the faults.
- The affected maintenance subsystem can alert maintenance personnel visually at the MAP terminal visual display unit (VDU).
- Activation of the corresponding audible and visual alarm hardware cannot occur.

The alarm system uses two SD points to generate the OAU alarm. One SD point is in the OAU and the other is in the standby MTM or ISM. The alarm system uses the same SD points to generate the dead system alarm. Each SD point controls the OAU alarm relay and a normally-open dead system (DS) relay.

The critical bell on the audible alarm panel and the critical system lamp on the ACD are connected to ground through break contacts in the DS relay in the OAU and standby MTM or ISM. The -48V battery feed connects to the critical bell from the OAU shelf and the critical system lamp from the standby MTM or ISM shelf. Both alarm SD points are released when the OAU and standby MTM or ISM detect a loss of communication with CC. This SD point release closes break contacts of both dead system relays, which generates the audible and visual critical system alarm indications.

Enhanced dead system alarm

The enhanced DSA generates the same audible and visual alarms as the basic DSA. The enhanced DSA also detects the loss or degradation of call processing.

With the enhanced DSA, the OAU attempts to make a call to CC about every 5 s. If CC does not answer a call within 20 s, the OAU activates the required critical alarms. Central control counts the calls the OAU makes. If CC does not detect any calls in 20 s time period, the alarm system generates a critical no call processing alarm (NCPALARM) at the External (EXT) alarm level.

The Enhanced DSA alarm is active when you set office parameter ENHANCED_DEAD_SYSTEM_ALARM in table OFCENG to YES. You do not require a restart to change the setting of this office parameter. Note that dead system alarms can occur during the change.

Note 1: The Enhanced DSA does not function on some international switches. These switches have SD points MTMFAIL and OAUFAIL on MTM or ISM that require the IMTMEX exec lineup.

Note 2: Office parameter ENHANCED_DEAD_SYSTEM_ALARM is available in all types of alarms systems.

Common Channel Interoffice Signaling (CCIS) dead system alarm

When an office in a CCIS network experiences a critical failure, the office sends a broadcast dynamic overload control level 3 (BDOC3) message to the rest of the network. This message is a network management message that causes the system to reroute traffic intended for the failed office.

The system can detect a dead system condition at the near end and inform the CCIS network. The system monitors the sanity of the CC in the message switch and buffer (MSB) peripheral. If the CC in the MSB does not operate, a BDOC3 message is sent from the MSB outward.

When the signaling transfer point (STP) receives a BDOC3 from the failed office, it sends the BDOC3 to other offices that use the same signaling link the BCDO3 arrived on. Transmission of the BDOC3 must occur on each link connected to the affected MSB.

This process ensures that the failed office does not have to send BDOC3 messages to all the offices connected to the failed office.

Dead system alarm and network management

Offices have a hardware link between the network management control and DSA that permits level 3 dynamic overload control signalling (SDOC3). For more information refer to *Network Management System Reference Manual*, 297-1001-453. The system automatically activates this link when the office loses call processing capability. This condition can occur when the operating company performs warm, cold, and reload restarts (See Figure 6-1).

To avoid a situation in which the alarm system sends dead system signals to network management (NWM), the following events occur.

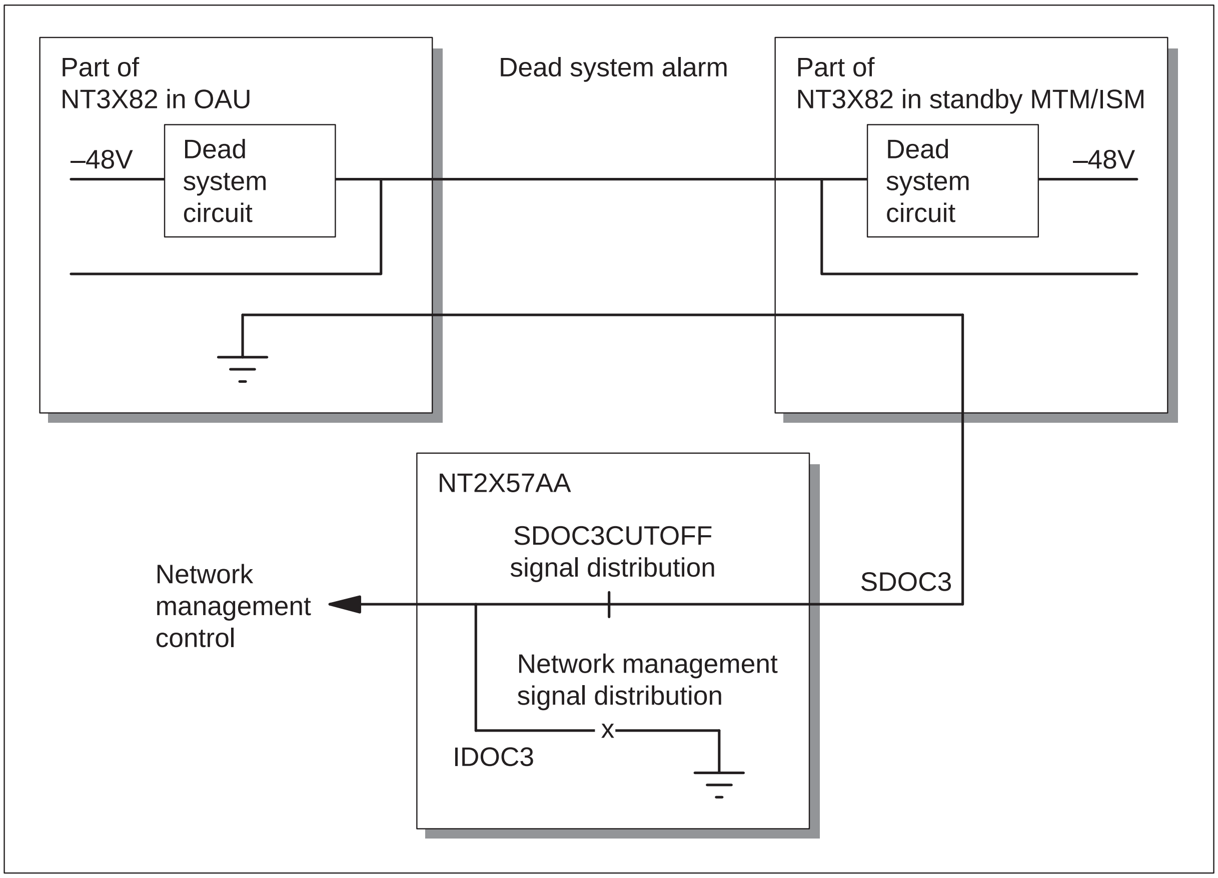
1 When you test one side of the DSA or operate a DSA-related scan point, a link break occurs.

2 Operation of the SDOC3CUTOFF SD point occurs when an SDOC3 hardware link break occurs.

3 The link break does not affect network management IDOC3 hardware.

4 When you complete the DSA test, restoration of the SDOC3 hardware link occurs (See Figure 6-1).

Figure 6-1
DSA-NWM interaction example



Remote dead system indication

If the office is not attended when the dead system condition occurs, the Version 1 OAS allows the transfer of the alarm to a remote monitoring location. Remote alarm transfer must be active for transfer of the alarm to a remote monitoring location.

In the Version 2 OAS, remote dead system indication is provided in one or more of the following ways:

- You can install the OAU alarm transfer (NT3X83) card and activate the remote alarm transfer feature. Chapter 3 contains a description of the NT3X83 card. If a dead system alarm condition occurs, the system sends a major alarm indication to the monitoring office.
- You can install the OAU alarm sending card (NT3X84). Chapter 3 contains a description of the NT3X84 card. If a dead system alarm condition occurs, the system sends an alarm indication to the remote monitoring location. This process is described in the Dead system alarm section of this chapter.
- The alarm sending and checking (software) feature, described later in this chapter, provides the dead system alarm indication.

In the EAS, make and break remote alarm contacts are available on the NT3X82AC and NT3X82AD cards. These contacts activate when the system detects a dead system condition. The contacts control external equipment. Arrangement of the contacts is through a common lead that connects to both the make and break contacts.

FSP/MSP alarms

Each frame supervisory panel (FSP) or modular supervisory panel (MSP) in an office has alarm circuits that monitor the office battery and alarm battery supply (ABS) fuses on that FSP (frames) or MSP (cabinets). These alarm circuits monitor the alarm leads from equipment mounted in the frame or cabinet. The alarm circuits light the appropriate frame or cabinet fail, fan fail, or converter fail lamps when the alarm system detects a failure. The alarm circuits also provide an output on the aisle alarm loop. Several types of FSP or MSP can meet the power and fusing requirements of equipment on different frame or cabinet types. These FSP or MSP types can detect alarm conditions associated with equipment on different frame types.

The system multiples the aisle alarm loop for each equipment aisle from frame to frame or cabinet to cabinet. This paralleling occurs through control relay contacts in the alarm circuit of each FSP or MSP in the aisle. The aisle alarm loop directly controls end-aisle pilot lamps for each aisle light. If an FSP or MSP in the aisle detects a fault, the aisle alarm loop closes and the end-aisle pilot lamps light.

The aisle alarm loop for each aisle in the office also connects to an FSP or MSP alarm scan point in the OAU through one of the following:

- connectorized cables and the alarm crosspoint field or alarm cross-connect unit shelf. See Figure 2-2 for further details.
- distribution frame (DF)

- cross-connections

Assign one FSP or MSP alarm scan point for each equipment aisle in an office. For more information, refer to *NT5X64 Series Communication Modules Description, Ordering Information, Installation, Operation, and Maintenance*, 297-1001-157. When an FSP or MSP alarm scan point detects an aisle alarm loop (FSPA ISxx alarm) a 20 second delay loop will start in the OAU software. Enable this delay in the software table OFCENG. If this same alarm occurs more than once in this time period, the system determines the alarm is a bouncing fan alarm and ignores it. The system does not generate an alarm condition. Otherwise, the external alarms subsystem generate a major audible alarm. The subsystem generates the appropriate display on the MAP terminal VDU. For more information, refer to *External Devices Maintenance Guide*, 297-1001-593.

Power distribution center (PDC) alarms

The FSP for the PDC provides the following alarm outputs: alarm battery supply (ABS), PDC, and aisle alarm loop. The closure of the aisle alarm loop generates an FSP alarm for the aisle as described in the previous section. The ABS and PDC alarm outputs from each PDC in an office connect to the alarm crosspoint field or alarm cross-connect unit (AXU). These outputs also connect to the DF. The ABS alarms connect to the ABSFAIL scan point in the OAU. The PDC alarms connect to the PDCFAIL scan point in the OAU. When the system detects an ABS or PDC alarm, the External Alarms subsystem generates the appropriate audible and visual alarms. The FSP alarm, which identifies the aisle that generated the alarm, always accompanies the ABS FAIL and PDCFAIL alarms. For more information, refer to *NT5X64 Series Communication Modules Description, Ordering Information, Installation, Operation, and Maintenance*, 297-1001-157.

EAS and LPA versions, the NT3X82AC and later versions detect the loss of the A or B feeds, or both. The NT3X82AC and NT3X82AD cards activate the critical bell or common audible and the critical power plant lamp. The A or B feed loss contacts are on the PDC and connect to the NT3X82 cards. At the PDC, the system powers up the PWR relays if a feed loss at the PDC occurs.

Low voltage and power loss alarm circuits

The following paragraphs describe low voltage and power loss alarm circuits in various alarm systems.

Low battery voltage detection circuit

Version 2 enhanced alarm system (EAS)

In the EAS, a low battery voltage detection circuit monitors the -48V office battery supply (feed). This circuit activates an alarm when the battery

voltage reaches a threshold. You can set the threshold by selecting one of the dip switch settings in listed the following table.

Dip switch setting	Threshold range
HI	–49.4 V to –50.5V
MED	–47.8V to – 48.8V
LOW	–46.6V to –47.7V
TEST	–73.9V to –76.1V

The correct dip switch setting depends on the battery voltage in the office. The HI setting is appropriate for most offices. The TEST setting is used to test low battery voltage detection. You must reset the dip switch immediately after you test low battery voltage detection capability.

Note: You must select only one dip switch setting at a time. The selection of more than one setting changes the threshold to an incorrect value. This condition can trigger a false low battery voltage alarm.

You use datafill in tables ALMSCGRP and ALMSC to assign the low voltage scan point on the NT3X82 card. When low battery voltage detection is active, the system generates a major alarm and a corresponding log report to notify maintenance personnel. The system generates a log report every 15 seconds as long as a low voltage condition exists.

Low power alarm system

The low voltage detector switch, present in previous NT3X82 versions, is a seven-position dip switch that sets the range for monitored ABS voltage. If the ABS voltage drops below the alarm condition threshold, the alarm system generates an alarm. This feature is not ISG-compliant and is not available on earlier –60V versions on the NT3X82. The following table contains dip switch information.

Dip switch functions

Switch	Label	Application	Alarm generation thresholds
1	HIGH (domestic)	–48V	–49.5V to –50.5V
2	MED (domestic)	–48V	–47.5 V to –48.5V
3	LOW (domestic)	–48V	–45.5V to –46.5V

—continued—

Dip switch functions (continued)

Switch	Label	Application	Alarm generation thresholds
1	HIGH (international)	–60V	–64.5 to –65.5V
2	MED (international)	–60V	–59.5V to –60.5V
3	LOW (international)	–60V	–57.5V to –58.5V
—end—			

A and B feed loss detection circuit

EAS

The NT3X82 card has three power (PWR) relays that the system does not power up during normal operation. When the system loses one or both of the A or B power feeds at the power distribution center (PDC), the system activates the PWR relays on the NT3X82 card. The relays remain activated until the system restores the A and B feeds.

When activation of the PWR relays occurs, the system activates the critical cell and critical plant lamp on the NT3X82AC.

Remote alarm contacts

OAS Version 2 and EAS

The circuit on the NT3X82 that connects through a common lead contains three remote alarm contacts. The loss of A and B feed detection (PWR2) relays drive one contact. This contact establishes a make connection when the system loses one or both of the A or B feeds at the PDC. The other two contacts are make and break contacts the dead system relay drives.

Audible alarm reset

The audible alarm reset switch on the ACD provides the capability to silence audible alarms. If the CC functions correctly, you can silence the audible alarms with one of the following actions:

- Enter the SIL command at the MAP terminal. The software detects the SIL command directly.
- Activate the non-locking audible alarm reset switch on the ACD for a short time. Scan points in both the OAU and standby MTM or ISM detect the operation of the switch. Alarm system software monitors these scan points.

If a dead system alarm condition occurs, the CC software is not functioning and cannot communicate with the OAU and standby MTM or ISM. Multiple faults in the hardware of the message system cause this loss of

communication. In this situation, CC software cannot silence audible alarms.

When the alarm system generates the dead system alarm, the audible alarm reset switch connects to the alarm system through contacts in the dead dystem relays. This reset switch connects to the winding of normally-open alarm reset relays in the OAU and the standby MTM or ISM. When a dead system condition occurs, operation of the audible alarm reset switch operates the two alarm reset relays. These relays open the ground path to the critical bell in the OAU and the standby MTM or ISM. The alarm reset relays then lock and the alarm silences. The system automatically releases the alarm reset relays when the dead system condition clears.

Trunk test center (TTC) alarms

The Trunk Test Center (TTC) is the area of a DMS office that contains the MAP terminal you use as a trunk test position (TTP). The TTP, which is described in *Lines Maintenance Guide*, provides a user interface for the trunks subsystem of the DMS maintenance system.

The following alarm conditions are related to the TTC:

- incoming call on a 101 communication test line
- trunk group out-of-service alarm

Test line alarm

The 101 test lines terminate at the TTP voice communications module. An incoming call on one of these lines connects a ground to a scan point in the OAU. The alarm system software detects the grounded scan point and sets the SD point assigned for 101 test line seizure. This action sounds the TTC chime through the operation of a relay in one of the following OAU cards:

- office alarm circuit #2 card (NT2X42).
- OAU alarm transfer card (NT3X83AA, AB, AC, AD, or BA).

When someone answers a call or the calling party disconnects, the system removes the ground from the scan point and silences the alarm.

Trunk group alarm

The trunk group alarm is a system alarm that the trunk maintenance subsystem software generates. The number of trunks out of service, system busy, and manual busy in one trunk group determines the severity of the alarm: minor, major, or critical. *Trunks Maintenance Manual* contains descriptions of the VDU alarm status displays and alarm thresholds for the trunk group alarms.

Trunk test center night alarm transfer

The night alarm transfer circuit provides the capability to transfer the TTC alarms to the main office alarm system. When the TTC area is not attended, you require this transfer. Operation of the locking night alarm transfer switch on the ACD or an exit alarm panel activates night alarm transfer. The night alarm transfer lamp, which is above the night alarm transfer switch, lights on the ACD and on all exit alarm panels. This lamp lights to indicate that night alarm transfer is active.

With night alarm transfer active, if incoming calls to 101 test lines arrive at the TTP, the following occurs:

- The calls generate a minor system alarm instead of sounding the TTC chime.
- The trunk test center lamp lights on all exit alarm panels.
- The trunk maintenance subsystems continues to generate the trunk group minor, major, or critical alarms.

A scan point in the OAU detects the operation of the night alarm transfer switch. This scan point operates an SD point-controlled relay in one of the following cards in the OAU:

- office alarm circuit #2 card, NT2X42 (OAS Version 1).
- OAU alarm transfer card, NT3X83AA, AB, AC, AD, or BA (OAS Version 2, EAS, and LPA).

The relay opens the TTC chime circuit and lights the TTC lamps.

Remote alarm transfer

The remote alarm transfer circuit transfers major and minor alarm indications from the DMS office and power plant to a remote alarm receiving circuit in a distant office. This transfer allows a local office to be unattended. The remote alarm receiving circuit monitors two severities of alarms, major and minor. The alarm system transfers critical alarms to the remote location as major alarms. If alarm grouping is active, the system transfers alarms that originate on preceding and succeeding floors to the remote monitoring location.

You can transfer alarms to the distant office by one of the following actions:

- activation of the non-locking alarm transfer switch at the ACD
- operation of the non-locking alarm reset key at the remote alarm receiving circuit in the distant office

The alarm transfer lamp, which is located above the alarm transfer switch on the ACD, lights when the alarm transfer occurs. To cancel the remote alarm transfer, activate the switch or operate the key a second time. To reset alarm

indications at the distant office, operate of the alarm reset key twice. This cancels and then activates the remote alarm transfer.

The Version 1 OAS transfer circuit contains four relays and the associated wiring. This circuit is in the office alarm circuit #2 (NT2X42) card in the OAU. The transfer circuit communicates over two leads with the remote alarm receiving circuit in the distant office. Connection occurs through the alarm crosspoint 1 field, the DF, and a cable pair. The transfer circuit uses the 130 V supply for signaling.

Remote alarm transfer is also available in Version 2 OAS. For this capability, you must install an OAU alarm transfer (NT3X83) card that contains all the required components. If you install an OAU alarm sending (NT3X84) card instead of the alarm transfer card, the dead system alarm sending facility replaces the remote alarm transfer facility. The following section describes the dead system alarm sending facility.

Dead system alarm sending

When a dead system alarm condition occurs, the dead system alarm sending circuit sends a signal over an operator verification trunk. Release of the DS relays in the OAU dead system (NT3X82) cards in the OAU and standby MTM or ISM occurs. This release results in a ground connection to the DS relay of the OAU alarm sending card. The system then generates a 480-Hz tone. The system seizes an idle trunk and transmits the tone on the seized trunk.

Alarm grouping

The alarm grouping circuit provides the capability to group alarms in a DMS office with other other alarms that originate on preceding (lower), and succeeding (upper) floors with compatible office alarm systems. Operation of the locking alarm grouping switch on the ACD or an exit alarm panel activates alarm grouping. The alarm grouping lamp, which is above the switch on the ACD and on all exit alarm panels, lights. This lamp lights to indicate that alarm grouping is active.

When alarm grouping is active in a DMS office, the following alarm treatments occur:

- **Alarms detected in the DMS office:** The system sends these alarms to the succeeding floor. The system always sends these alarms to the preceding floor, with or without alarm grouping active.
- **Alarms from preceding floor:** The system sends these alarms to the DMS office. Alarm grouping must be in effect on the preceding floor for this to occur.

- **Alarms from succeeding floor:** The system sends these alarms to the preceding floor. Detection of these alarms does not occur in the DMS. The system does not forward these alarms to the preceding floor unless alarm grouping is active in the DMS.

The Version 1 OAS alarm grouping circuit contains six relays and the associated wiring. This circuit is in the office alarm circuit #1 (NT2X41) card in the OAU. Alarm leads from the preceding and succeeding floors connect to the grouping circuit through the DF and the alarm crosspoint field (See Figure 2-2). The alarm system software generates audible and visual indications in the DMS office for alarms received from the preceding floor. The alarm system software generates these indications with or without alarm grouping active.

In Version 2 OAS, the alarm grouping (NT3X85) card installed in the OAU contains all the relays and wiring associated with the alarm grouping circuit. This card does not contain the connections between floors described in the previous paragraphs.

Alarm power supplies

OAS Version 1

In the Version 1 OAS, the system generates the following supplies in the office alarm circuit 3 (NT2X43) card:

- 130 V for the remote alarm transfer circuit
- 20-Hz ac ringing supply for the alarm battery subset, minor alarm subset
- TTC chime

An office alarm circuit 3 (NT2X43) card in the OAU and standby MTM or ISM duplicates the supplies described in the preceding paragraph. This duplication allows the alarm system to generate the correct audible alarm when one of the 20–Hz ac supplies fails. If one of the 130 V supplies fails in an unattended office and remote alarm transfer is active, the alarm system continues to send an alarm indication to the remote monitoring location.

The power supplies from the OAU and standby MTM or ISM connect to the alarm system. This connection occurs through the contacts of an SD point-controlled relay in each office alarm circuit 3 (NT2X43) card. Normally, only the power supplies in the OAU connect to the alarm system. If one or two of the OAU power supplies fail, the system switches the source for the two power supplies to the standby MTM or ISM. The system also generates an OAU alarm. When the fault in the OAU is corrected, the alarm system software automatically switches back to the OAU power supplies. If one of the standby MTM or ISM power supplies fails when the OAU power supplies are not available, the both 130 V and 20-Hz ac power supplies are out-of-service.

OAS Version 2

In the Version 2 OAS, the 130 V power supply for the remote alarm transfer circuit is in the card that contains the alarm transfer circuit. Only one of these cards is present so a backup power supply is not available. The failure of the 130 V power source causes the system to generate an alarm at the remote office.

The 20-Hz power supply, is avalable in the Version 2 OAS only if the OAU dead system card with unique audible (NT2X82AA, AC, AE, AF, AH or AK) is used and is duplicated in the standby MTM or ISM. Like the Version 1 OAS, if the 20-Hz supply from the OAU fails, the system raises the OAU alarm and switches the source for the supply to the standby MTM or ISM. When the fault is corrected, the system automatically switches the source back to the OAU.

Loop closure

Version 2 OAS provide loop closures to the DF for critical, major, minor, and OAU alarms. Loop closures can be used for the following:

- to drive external alarm sending equipment
- distribution to a central maintenance center

Local talk line circuit

The local talk lines are two office telephone lines that terminate at the MAP voice communications module logic telephone set. These lines connect so that line 1 serves all odd aisles and line 2 serves all even aisles in the office. The odd aisles are A, C, E, G in a continuing sequence. The even aisles are B, D, F, H in a continuing sequence.

OAS Version 1

In the Version 1 OAS, line 1 connects through the DF and the alarm crosspoint field to a transformer in the office alarm circuit #3 (NT2X43) card of the OAU. This transformer divides the line into a transmit and a receive path. From the transformer, the line connects back to the alarm crosspoint field. At the alarm crosspoint field, the line is multipled to all odd aisles in the office. At each odd aisle, line 1 is multipled, from frame to frame, to the A and B talk line jacks. These jacks are on every FSP. A telephone headset plugged into the talk line jacks of any FSP completes the speech path.

Line 2 is multipled to all FSP in the even aisles, in the same way. One difference is that the transformer for line 2 is in the office alarm circuit #3 (NT2X43) card in the standby MTM or ISM. This location ensures that one talk line is available if a failure occurs in the standby MTM or the OAU.

OAS Version 2

The local talk line circuit is also available in the Version 2 OAS if OAU dead system cards with unique audibles (NT2X82AA AC, AE, AF, AH or AK) are in the OAU and standby MTM or ISM. These cards contain the transformers and related circuits for the local talk lines. The Version 2 talk line circuit provides the functions described in the previous section.

Data loop system

The office data loop system provides a 4-wire facility for the transmission of data between the DMS switch and terminal devices. An example of a terminal device is a mobile switch maintenance VDU. These devices are the terminal devices on an equipment aisle in the office or at the DF. The system also provides a facility for point-to-point data transmission between test equipment at different locations in the office.

The data loop system contains the following hardware:

- three data loop control switches on the ACD
- data link control cards (NT0X89) in the alarm crosspoint field shelf (See the section on alarm crosspoint field shelf [version 1 OAS] or AXU [Version 2 OAS]
- a maximum of two data communication ports that originate at terminal controller cards in the input/output controller (IOC)
- data loop transmit and receive jacks on each FSP or MSP in the office
- data loop jacks mounted on the DF

The data loop jacks on each FSP or MSP in each equipment aisle in the office multiply from frame to frame. These jacks connect to the alarm crosspoint field shelf or AXU. At the alarm crosspoint field or AXU, the data loops of all odd aisles and all even aisles multiply together. The odd aisles are A, C, E, G in a continuing sequence. The even aisles are B, D, F, H in a continuing sequence. The data loop activation circuits on the ACD panels are designated as follows:.

- A for odd aisles
- B for even aisles

The A and B aisle multiples connect to relay contacts in the data loop control card(s).

The data communication ports at the IOC connect through cable to the alarm crosspoint field or AXU. Data loop jacks for the A and B aisle multiples at the DF connect through cable to the alarm crosspoint field. These ports and jacks connect to the appropriate pins on the data loop control cards.

The data loop control switches on the ACD panels control the operation of the data loop control cards. The A switch controls the data routing for the A aisle multiple. The B switch controls the data routing for the B aisle multiple. The A + B switch, when activated, joins the A and B aisle multiples together. Different combinations of the three switches provide the following alarm routing options:

1 A aisle multiple to IOC port A, DF, or open
2 B aisle multiple to IOC port B, DF, or open
3 A and B aisle multiples joined to IOC port A, DF, or open

Alarm sending and checking system

The alarm sending and checking system (ASCS) is a software feature compatible with all versions of the OAS. When active, the feature provides the ability to send indications of alarm conditions that occur in the DMS office. These alarm indications transmit over a trunk to a remote operator position.

If the receiving operator is at a Traffic Operator Position System (TOPS) position, an ANI-8 information digit, spilled over the trunk converts to an alarm indication on the video screen. The operator uses the TOPS facility to access additional information.

If the trunk termination is a normal operator position, when the recipient answers the call, the system generates a tone across the trunk. This tone indicates that the originating office has an alarm condition. The operator dials a directory number (DN) allocated to the ASCS checking facility. The

operator hears a tone from the office that indicates the severity of the alarm condition.

The operating company assigns the tones and directory numbers in use for ASCS and the specified parameters for the feature. For more information, refer to the data schema section of *Translations Guide*. The following table shows the normal tone assignment.

Tone	Meaning
Continuous high, low, or ringback tone.	These tones indicate the presence of an alarm condition in the originating office. The operator receives these tones first. When you dial the appropriate ASCS DN, the tone condition received indicates the class of the alarm. These indications follow:
No tone	Critical alarm
Busy tone	Major alarm
Code 1 ringback tone	Minor alarm
Code 2 ringback tone	No alarm

The ASCS can repeat the alarm indicating call if the alarm condition is not corrected. The ASCS can also repeat the alarm indicating call to indicate that the alarm severity increased after the checking call.

When the office is not attended, operation of the alarm transfer switch on the ACD can activate the ASCS feature. You can also activate the ASCS feature with the ASCS ON command. You can deactivate the feature with the ASCS OFF command.

The ASCS command allows the user to change or verify the status of the ASCS feature.

Note 1: If you enter the ASCS command without parameters, the system displays the current status of the ASCS sending facility. This status is ASCS ON if the facility is active. The status is ASCS OFF if the facility is not active.

Note 2: Installation of the ASCS feature causes activation of the checking facility. Maintenance personnel can use the facility to check the office. The operation of the alarm transfer switch does not affect the checking facility. The ASCS command does not affect the checking facility.

Remote site alarms

A remote site can have alarm capability with the use of scan and signal distribution cards. An ACD panel with common audible (CA) alarm is also at the remote site. When an alarm condition occurs, a scan point detects the condition. The alarm information transmits to the host office through the DS-1 facility. The host office operates the appropriate signal distribution point. This action causes activation of the alarm signaling device at the host site. Signal distribution cards at the remote site control the ACD panel operation. For this reason, the AAR switch on the ACD panel at the remote site does not function. To silence the CA alarm, you must activate the alarm disable (DA) circuit and then manually reset when you require audible alarm indications again

RLM alarm extension circuit

In NT0X45-type RLM offices, the alarm extension circuit NT5X92 can expand the audible and visual alarm abilities beyond those normally available from the ACD panel with common audible (NT0X63AC). For more information, refer to Figure 6-2).

This alarm extension circuit provides the common audible alarm at a maximum of ten different locations in the same building. The alarm extension circuit extends alarm signals through relay contacts on the following:

- a maximum of five exit alarm panels (NT0X64)
- a total of two ACD panels (NT0X63)
- two other non-DMS systems

Activation of all these alarms occurs through signal distribution points. The alarm system logic defines these points or these points are assigned for each office and depend on data tables.

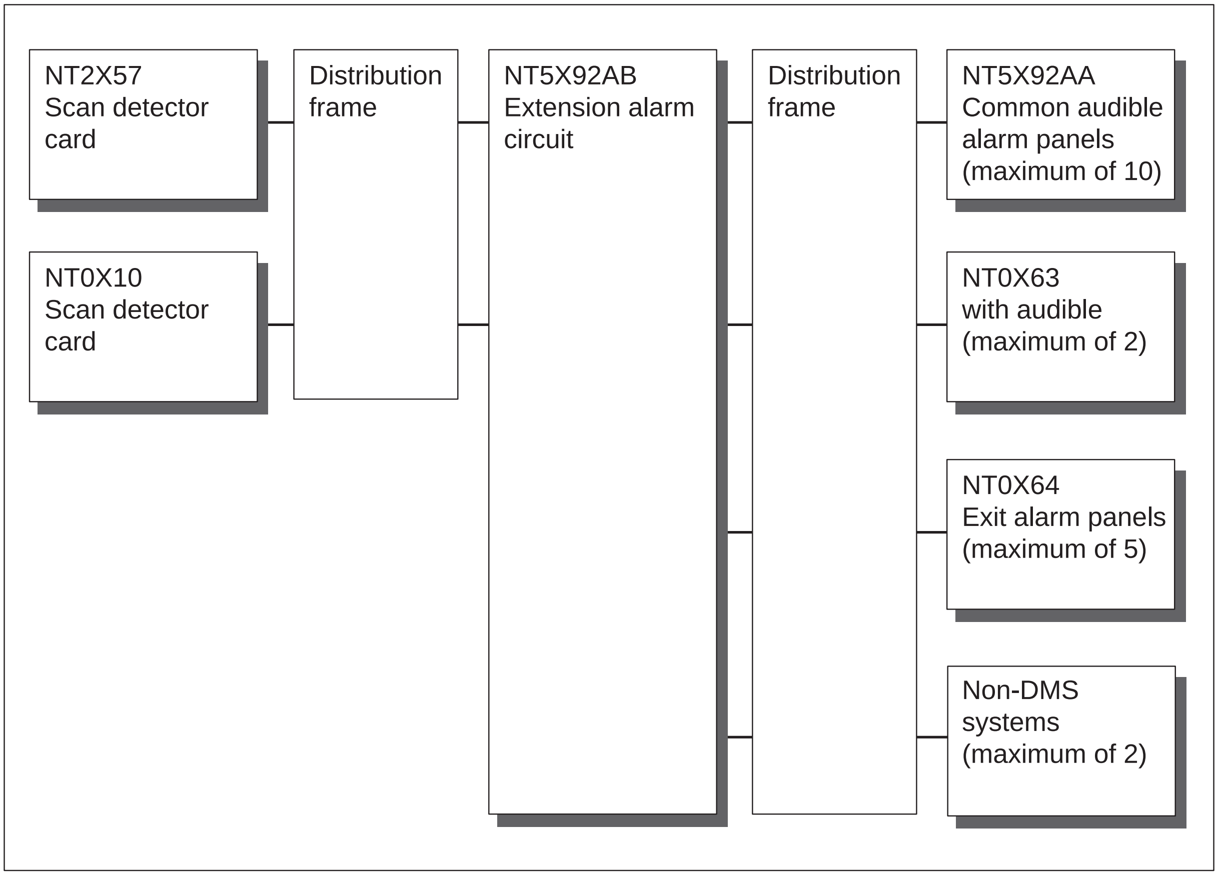
The alarm extension circuit contains one alarm extension unit (NT5X92AB) installed on a remote service equipment frame and a maximum of ten common audible alarm panels (NT5X92AA). These wall- or column-mounted panels are at locations that require audible alarm indications.

The NT2X57 signal distribution card replaces and performs the functions of the following circuits:

- DMS-100 alarm indication applique circuit (NT5X59AA, NT5X59AB)
- audible and visual alarms extension circuit (NT5X85AA)
- alarm extension circuit (NT5X92AB, NT5X92AD)

The replaced circuits provide additional connections to visual alarm, audible alarm, and exit panels, and other DMS or non-DMS equipment not part of the OAU or AXU.

Figure 6-2
RLM alarm extension



Centralized alarm reporting

The centralized alarm reporting (CALM) feature allows the host dynamic network controller (DNC) of a large business remote (LBR) switching network to retrieve the current alarm conditions for each DMS switch in the LBR network. The DNC can display these alarm conditions.

When active, CALM continuously scans the alarms status of the DMS subsystems. The scan results are displayed on the MAP display. The CALM feature compares each status with the status of the previous scan. If the system detects a change, the system transmits a new status to all logged in DNC. Current alarm status information is also available to the DNC on request.

List of acronyms

ABS
alarm battery supply

ACD
alarm control and display

ANI
Automatic Number Identification

ASCS
Alarm Sending and Checking System

CAMA
Centralized Automatic Message Accounting

CC
central control

CCIS
Common Channel Interoffice Signaling

DF
distribution frame

DMS
Digital Multiplex Switching

DOC
Dynamic Overload Control

DSA
dead system alarm

EAS
: Enhanced Alarm System

Ext
: External (subsystem)

FSP
: frame supervisory panel

IOC
: input/output controller

IPM
: interruptions per minute

ISM
: integrated services module

LPA
: Low Power Alarm (system)

MAP
: Maintenance and Administration Position

MDF
: main distribution frame

MTM
: maintenance trunk module

OAS
: Office Alarm System

OAU
: office alarm unit

PDC
: power distribution center

PM
: peripheral module

RLM
: remote line module

SD
: signal distribution

STP
: Signal Transfer Point

TOPS
: Traffic Operator Position System

TTC
: trunk test center

TTP
: trunk test position

UI
: user interface

VDU
: visual display unit

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DMS-100 Family

Alarm System Description

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